CADUCEUS

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for the health sciences

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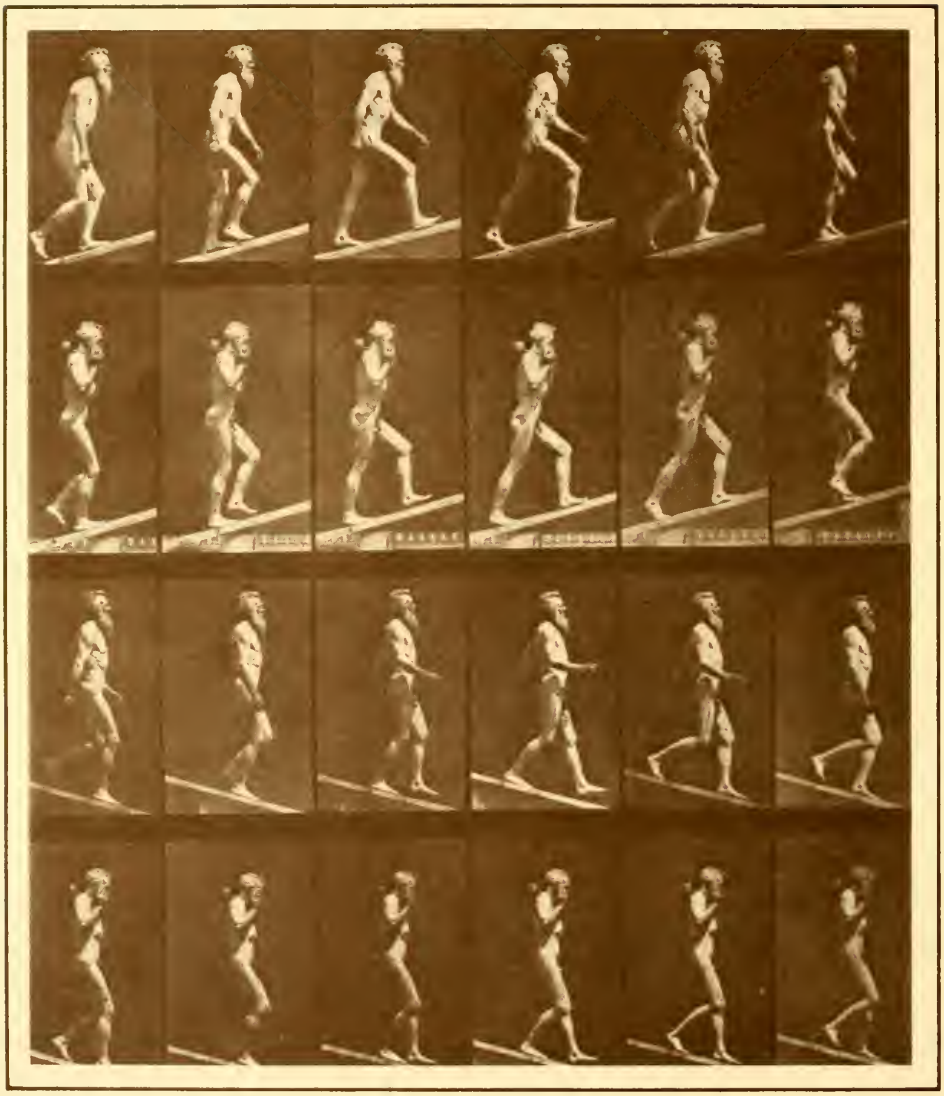


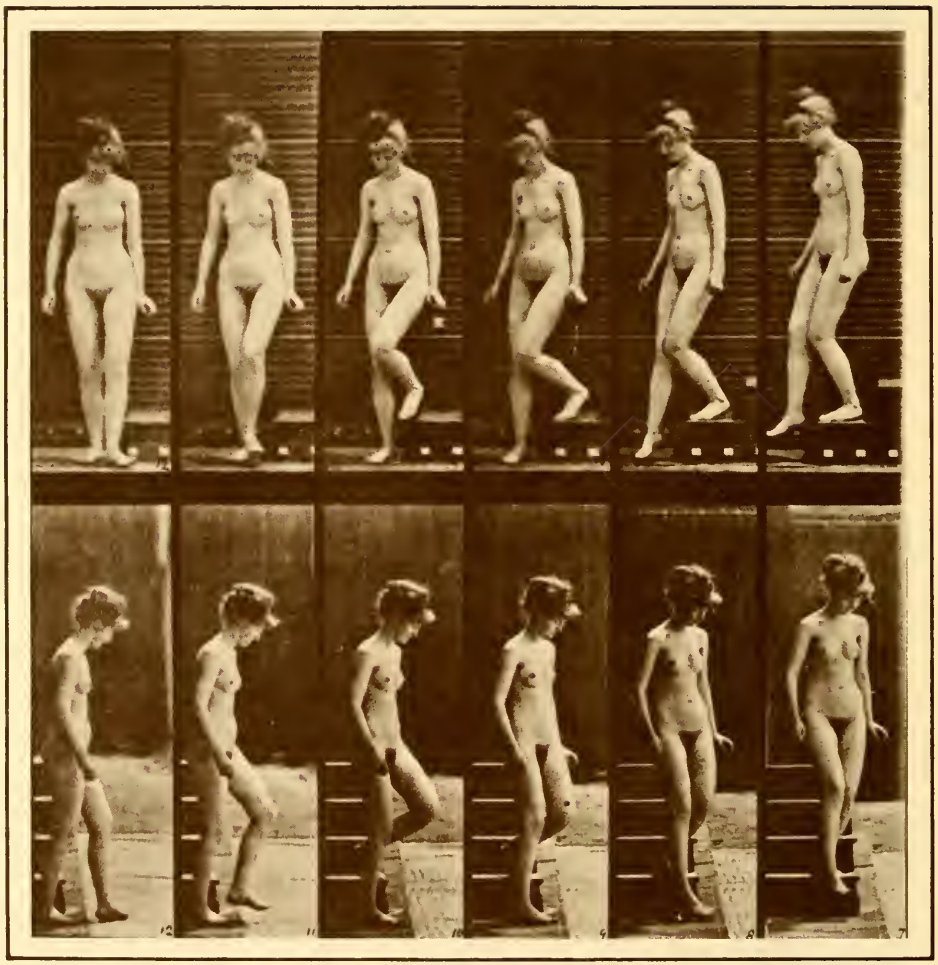
Muybridge plate 489 [detail]: Ascending and descending an incline [the subject is Muybridge himself]. (From Anita Ventura Mosley's Muybridge's Complete Human and Animal Locomotion, *vol. I, p. 246. Photo courtesy of University of North Carolina at Chapel Hill.)*

Francis X. Dercum and Animal Locomotion

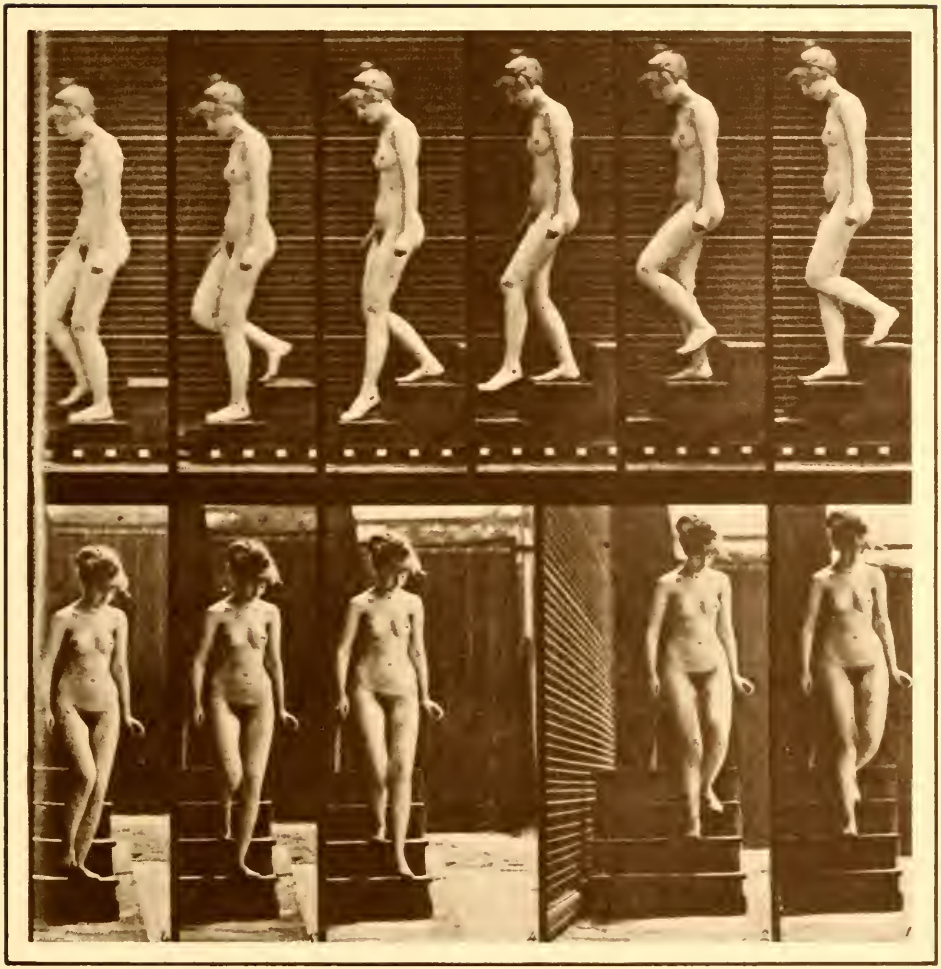
Michael R. McVaugh

The year '87 undoubtedly will remain an occasion for celebrations in Philadelphia—the centennial of the Constitution alone guarantees that.[1] But there will be other lesser observances in the historic city in the same year, not a few of them having to do with the history of medicine and the biomedical sciences—Philadelphia's College of Physicians, for example, was founded in 1787. One hundred years later, in 1887, a Philadelphia publisher produced Eadweard Muybridge's monumental *Animal Locomotion,* 781 sets of serial photographs of animals and humans that froze his subjects in their routine activities and allowed their movements to be studied sequentially.[2] These photographs were taken in Philadelphia in 1884 and 1885, with the support of the University of Pennsylvania.

Muybridge's work had a considerable influence in a number of diverse fields. There is some argument, for example, that his Zoopraxiscope is the antecedent of the motion picture. Art historians have seen in Muybridge's photographs of descent the inspiration for certain paintings by his Philadelphia friend Thomas Eakins. No one, however, has yet paid much attention to one feature of Muybridge's work that for a moment held the promise of leading to innovation in medical technology: a set of plates at the end of *Animal Locomotion* that portrayed not the motion of animals, not normal motion in man, but pathological movement.[3] Prior to any discussion



Muybridge plate 137: Descending stairs, turning around. [This sequence may have served as the model for Eakins's painting, William Rush and His Model*]. (From* Muybridge's Complete Human and Animal Locomotion, *vol. I, p. 406. Photo courtesy of University of North Carolina at Chapel Hill.)*

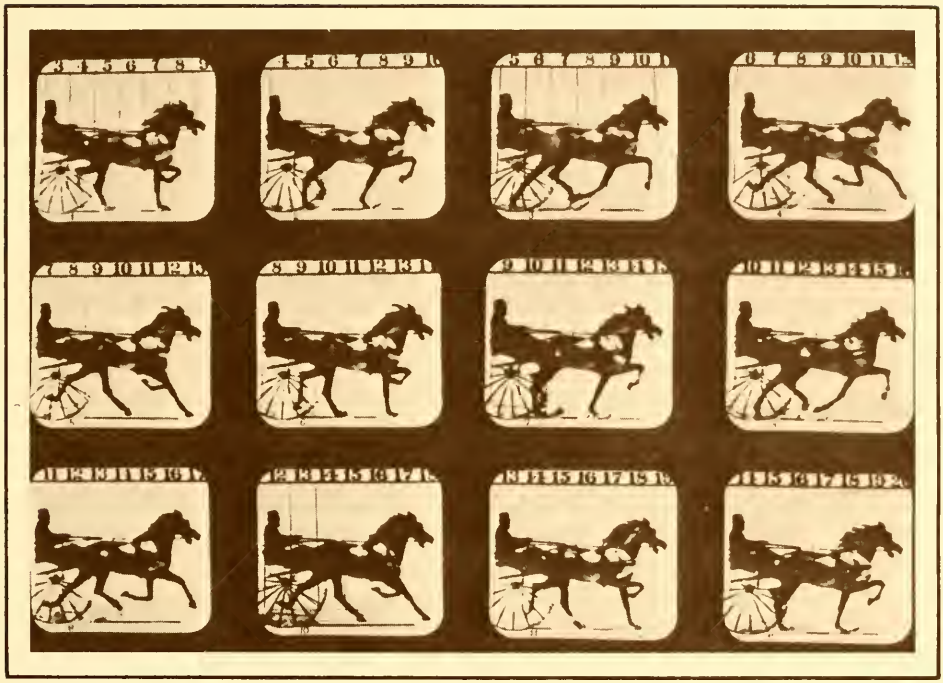


of the obvious potential these plates have for medicine, it is appropriate to relate pertinent background about Eadweard Muybridge himself, but also, more importantly, about Francis Xavier Dercum, the man truly responsible for these final plates.

Dercum was born in Philadelphia in 1856 of German immigrant parents. His father had been a member of the "generation of 1848" that left Germany after the failed revolution of that year.[4] From an early age Francis proved to be very interested in biology. In a high school debate he once defended the pro-evolution position and later, as a medical student at the University of Pennsylvania, he pursued the "strict mental discipline of physiology and anatomy."[5] He graduated from the university with his M.D.—and, after postgraduate summer school, a Ph.D.—in 1877.[6]

Two papers that Dercum published in the next few years, while he was a demonstrator in the physiology laboratory at the university, reveal a continuing commitment to sensory physiology. It was probably an aggressive biophysics approach that now led him to look for physical causation behind the phenomena associated with "psychic" activities such as trance and hypnosis and table-tipping, in conjunction with his former classmate Andrew Parker, who had been appointed professor of zoology at Pennsylvania. Parker has been described as "born with the peculiarities of temperament often associated with, but not causative of genius," a phrase that might equally apply to Dercum. In 1884 they published a joint paper describing the artificial production of convulsions by subjecting a subject's muscles to a constant and precise effort—for example, by holding his fingers just barely in contact with a table-top, or with his thighs, for an extended period.[7]

It was apparently his association with Parker, an anatomist studying cerebral morphology, that led Dercum to think about becoming a neurologist, but it was Horatio C. Wood who convinced him to commit himself to the field. In 1884 Dercum was made instructor in nervous diseases, and was appointed to succeed Charles K. Mills as chief of Wood's nervous clinic at the University of Pennsylvania. That same year he joined Mills in founding the Philadelphia Neurological Society, and accepted a post as consultant pathologist to the State Hospital for the Insane at Norristown. In 1893 Dercum was made clinical professor of neurology at Philadelphia's Jefferson Medical College, and continued to write widely while maintaining a considerable private neurological practice—attending Woodrow Wilson, for example, in 1919 and 1920. But his interests turned more and more to the philosophical and psychological. He was elected president of the American Philosophical Society in 1927, two years after his retirement, and his last



"Edgington trotting at a 2:24 gait:" a photograph by Muybridge of one of Stanford's horses, made in June 1878. (Photo courtesy of University of North Carolina at Chapel Hill.)

papers—"On the Nature of Thought and its Limitation" and "Non-Living and Living Matter"—were read during society meetings. He was presiding over a meeting of the society in April 1931, when he suddenly slumped dead in the president's chair.

Eadweard Muybridge (born Edward Muggeridge) had come to America from England in 1851, when he was twenty-one. By the middle of the decade Muybridge had decided to move to San Francisco, where he soon got the idea of becoming a photographer and selling landscapes of the American West. During the 1860s and early 1870s he prepared and sold portfolios of photographs of San Francisco, Yosemite, Alaska, and the Pacific Coast generally. His first photographic studies of motion date from 1872, when he photographed Leland Stanford's horse Occident to resolve the question of whether at some point a trotting horse has all four feet off the ground. Muybridge returned to the subject in 1878 and 1879, this time using a moving sulky to trigger electrically the shutters of a sequence of twelve cameras placed twenty-one inches apart, yielding a series of images of motion; at the same time he attempted (less successfully) photographic studies of other animals—ox, dog, goat, etc.—and at least once, of humans (athletes) in motion.[8]

The excitement aroused by Muybridge's work was such that he began to lecture before California audiences, illustrating his talks first with lantern slides and then with a machine he devised called the Zoopraxiscope. This device actually was a projecting lantern shining through a rotating glass disk on which silhouettes had been painted over a series of sequential photographs of horses in motion, and another counter-rotating slotted disk to act as a sort of shutter. The result was to reproduce the appearance of motion—Stanford is said to have been able to distinguish between his horses merely from the machine's re-creation of their gaits in silhouette.

From 1881 to 1882 Muybridge travelled to Paris and then London to lecture on his work, before returning to the United States to begin a series of lectures on the East Coast, and on this European tour he was made much of by the scientific world. Etienne-Jules Marey, professor of natural history at the Collège de France, had been trying since 1860 to describe accurately the various movements of animals, originally using a kymograph as a recording device; his research had culminated in a book, *Animal Mechanism* (1874), that had in fact influenced Muybridge's photography of horses for Stanford.

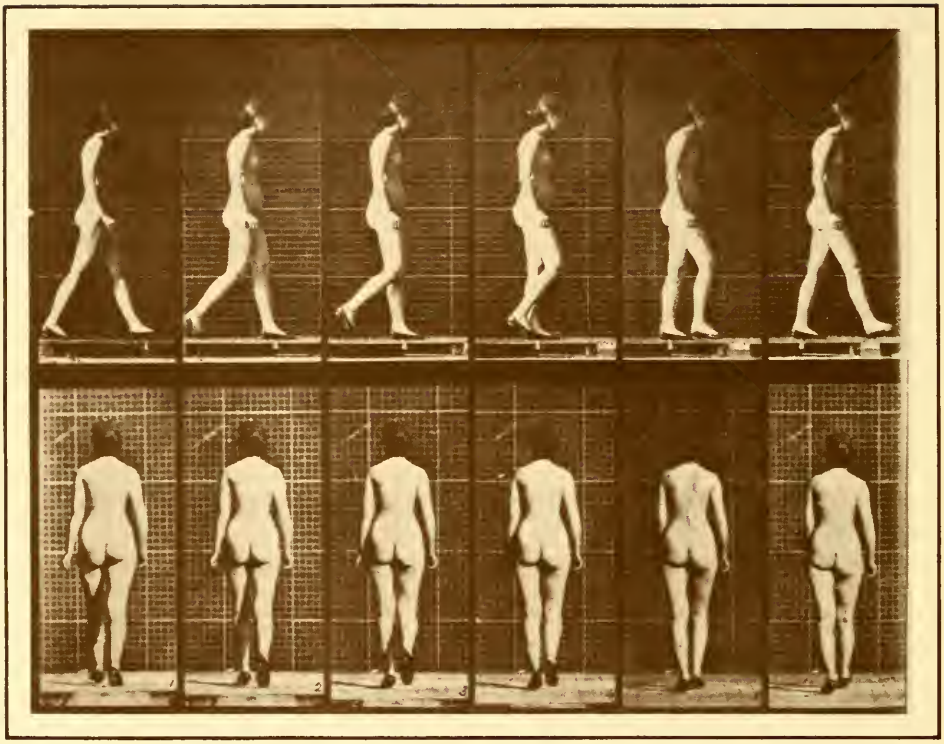
In turn, Muybridge's photographs of motion had attracted Marey, and the two men (who were just the same age) began to correspond in the late 1870s. The French physiologist now moved from the kymograph to the photograph

as a recording device. He devised a gun-like camera to register motions like flight, a camera that soon evolved into the "Marey's wheel," where successive images were recorded on a single moving plate. At this time, however, Marey was still limited by the small size of his images and the slowness enforced by his use of the wet-collodion process. It was Marey who acted as Muybridge's host when the latter brought his Zoopraxiscope to Paris in 1881, and in the course of his stay Muybridge began to recognize that his plans might arouse wide scientific interest.[9]

From mid-1882 onwards, Muybridge was on the lecture circuit in the United States, demonstrating his Zoopraxiscope and trying to get support for a huge project, a detailed series of experiments designed to furnish much larger images and, more importantly, to make use of the new technique of gelatin dry-plates. In early 1883 Fairman Rogers, a wealthy Philadelphian who had commissioned Thomas Eakins's painting *A May Morning in the Park* (1879), which made use of Muybridge's findings in its representation of horses in motion, brought these plans to the attention of William Pepper, the young physician who had been made provost of the University of Pennsylvania only two years before. Pepper set up a supervisory committee, which attended Muybridge's Philadelphia lectures in February 1883. After some negotiations, six guarantors put up $5,000 each, and Muybridge was formally invited to come to the university in August. An enclosure was set up in the university's newly opened Veterinary Department, and photography got under way in the late spring of 1884—that is, at the moment when Dercum was beginning his career in neurology.

As Muybridge was launching into his project, most of the committee members appointed to oversee the work went their separate ways on summer vacation. One who did not was Thomas Eakins, who had been taking conventional photographs for some years, and now during the summer began to experiment with his own photographic recordings of motion.[10] Eakins used a "Marey's wheel" for his photographs, and for a time that summer Muybridge considered adapting the technique for his studies—at least one "Marey's wheel" photograph made by Eakins was actually annotated by Muybridge.[11] Eventually, however, Muybridge settled on a modification of the Stanford procedure. He placed a battery of cameras parallel to the long wall of an open shed, and two other such batteries at either end, at angles of 60 or 90 degrees to the wall. This system allowed him to record two or three different perspectives of a single motion, as the "Marey's wheel" did not.

In two letters written forty-five years later, Francis Dercum explained how at this point he came to be involved in the Muybridge work.[12] Apparently Provost Pepper, who knew that Dercum "had become deeply interested in"

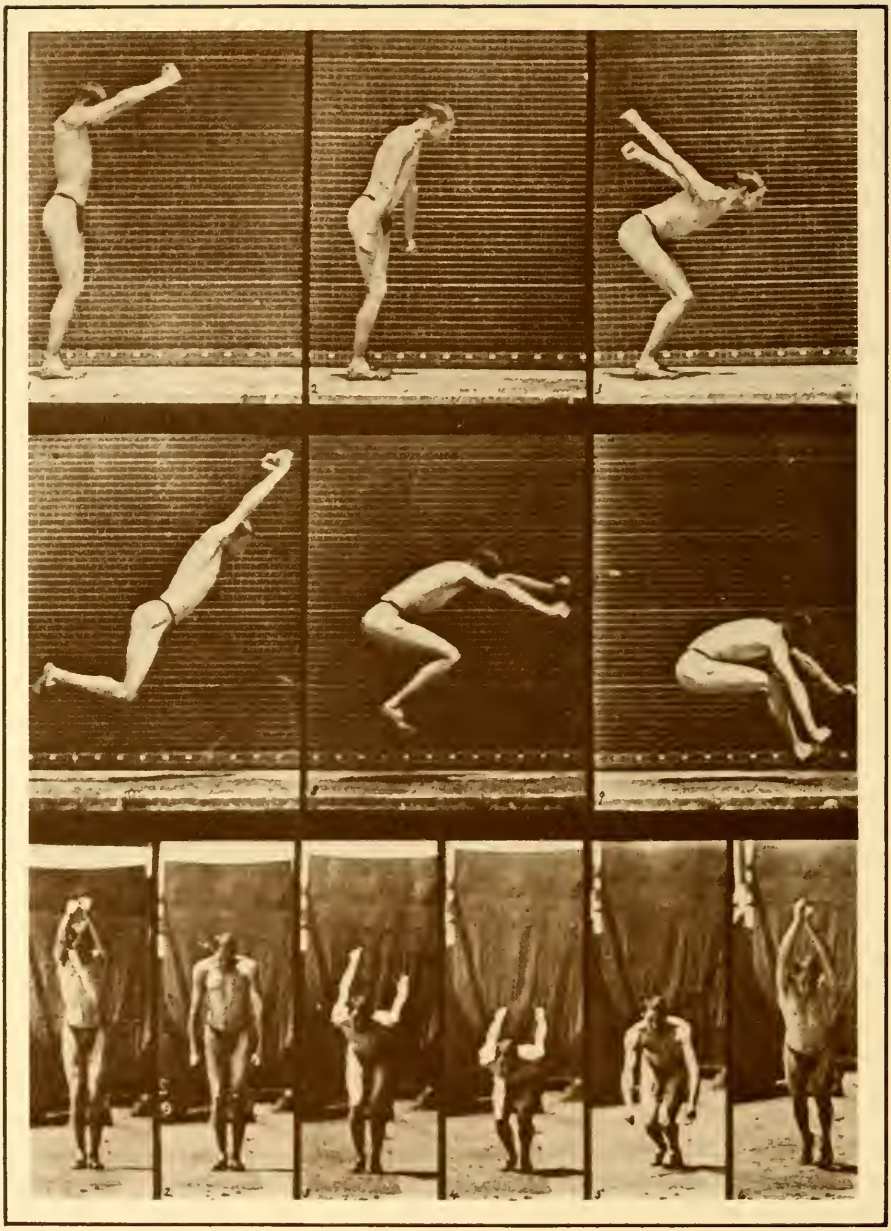


Muybridge plate 25 [detail]: Walking with high-heeled shoes on. (From Muybridge's Complete Human and Animal Locomotion, *vol. I, p. 294. Photo courtesy of University of North Carolina at Chapel Hill.)*

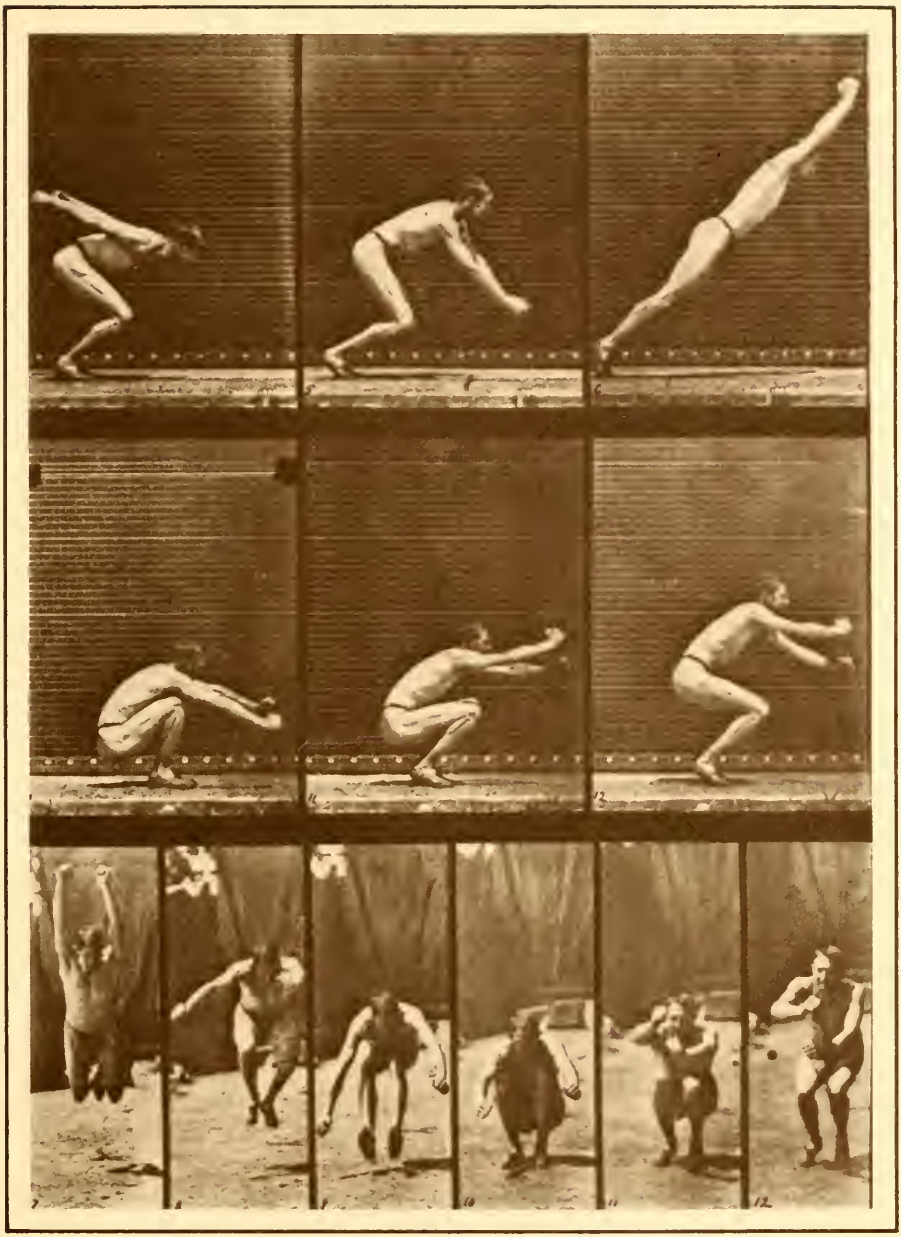
Muybridge's research, asked him to fill the gap left by the vacationing committee, and Dercum did indeed give the next two summers to this project. Dercum later explained: "Due to my connection with various athletic societies and various trotting organizations, I was able to furnish him with abundant material"—athletes and horses for motion studies. If Dercum is to be believed, it was also he who was responsible for involving J. Liberty Tadd in the Muybridge work. Tadd was principal of the public School of Industrial Art and was able to identify artists' models who would pose for the female series.

What had aroused Dercum's interest? It is quite possible that he believed that Muybridge's plans would offer a new way of studying the pathology of the "nervous" patients who had just come under his clinical supervision. Thomas Anshutz, a friend of Eakins and, like him, a Philadelphia artist, wrote in August 1884 that one result hoped for by "the University people" was for Muybridge "to photograph the walk of diseased people, paralytics, etc. So that by means of the zoopraxiscope . . . they could show their peculiarities to the medical students."[13] Muybridge had been talking of photographing pathological motion since at least early 1883, but even then he had explicitly ascribed the idea to "eminent physicians and experimental physiologists." This statement is perhaps a reference to the community of Philadelphia neurologists with whom at that moment he was coming in contact.[14] Was Dercum himself the immediate agent behind the clinical photography? Statements he made in 1888 and again in 1929 imply that he was. "Mr. Muybridge," Dercum wrote, "photographed *for me* [my italics] not only the normal human gaits but also the various pathological gaits of nervous patients"[15]—that is, Dercum claimed to have inspired the clinical photographs and more besides. There is some reason to believe his claim.

Anshutz's letter of 1884 added that the university people had been disappointed in their original expectations, that Muybridge's shutters were proving too clumsy and slow, and that the clinical photography "cannot be done even with the best known contrivances." Indeed, little actual photography of any subjects was carried out that year. In the summer of 1885, however, Muybridge was coming to the end of his own plans and seems to have allowed Dercum the opportunity now to choose his own subjects for photographic study. Muybridge was working at the Zoological Gardens well into August of 1885, photographing elephants, tigers, camels, and a variety of less exotic species, with Dercum and Andrew Parker in daily attendance; simultaneously, however, he was making other series of photographs of men and women that unmistakably respond to Dercum's particular concerns.[16]



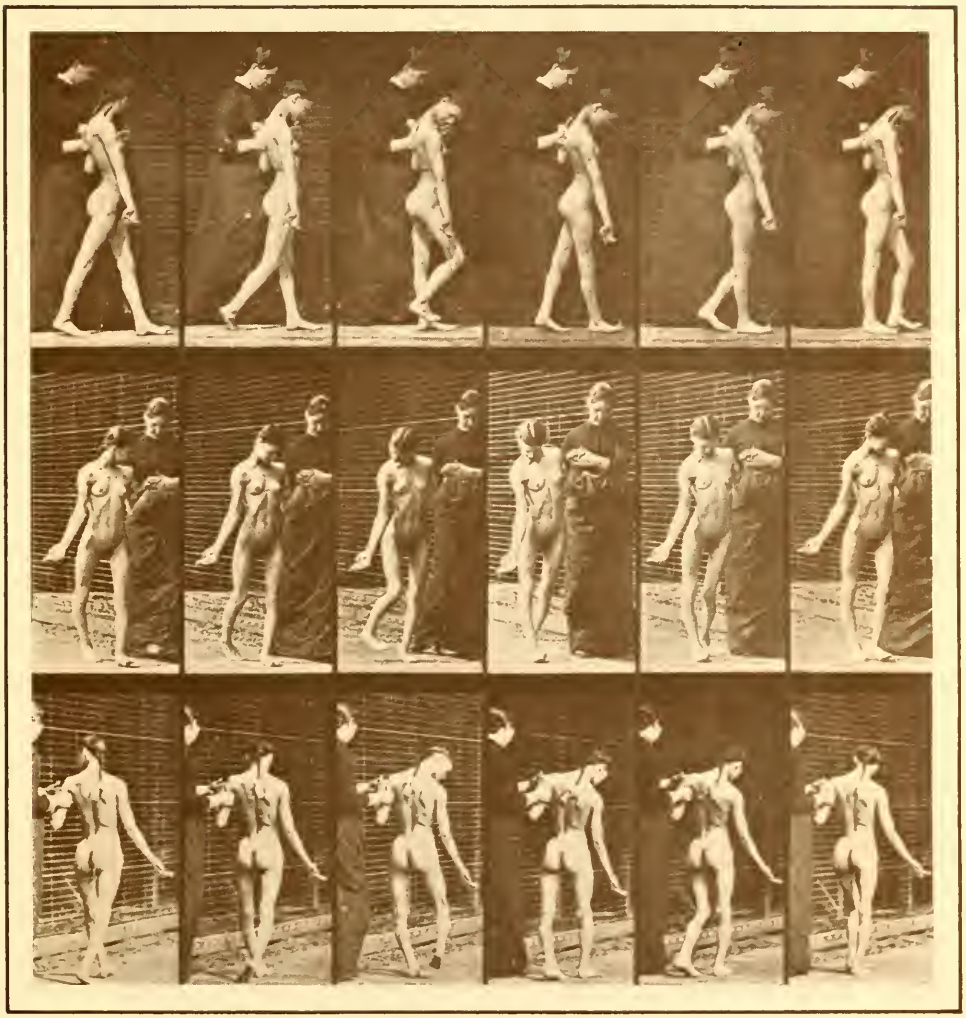
Muybridge plate 163: Jumping: standing broad jump (shoes). (From Muybridge's Complete Human and Animal Locomotion, *vol. II, p. 664. Photo courtesy of University of North Carolina at Chapel Hill.)*



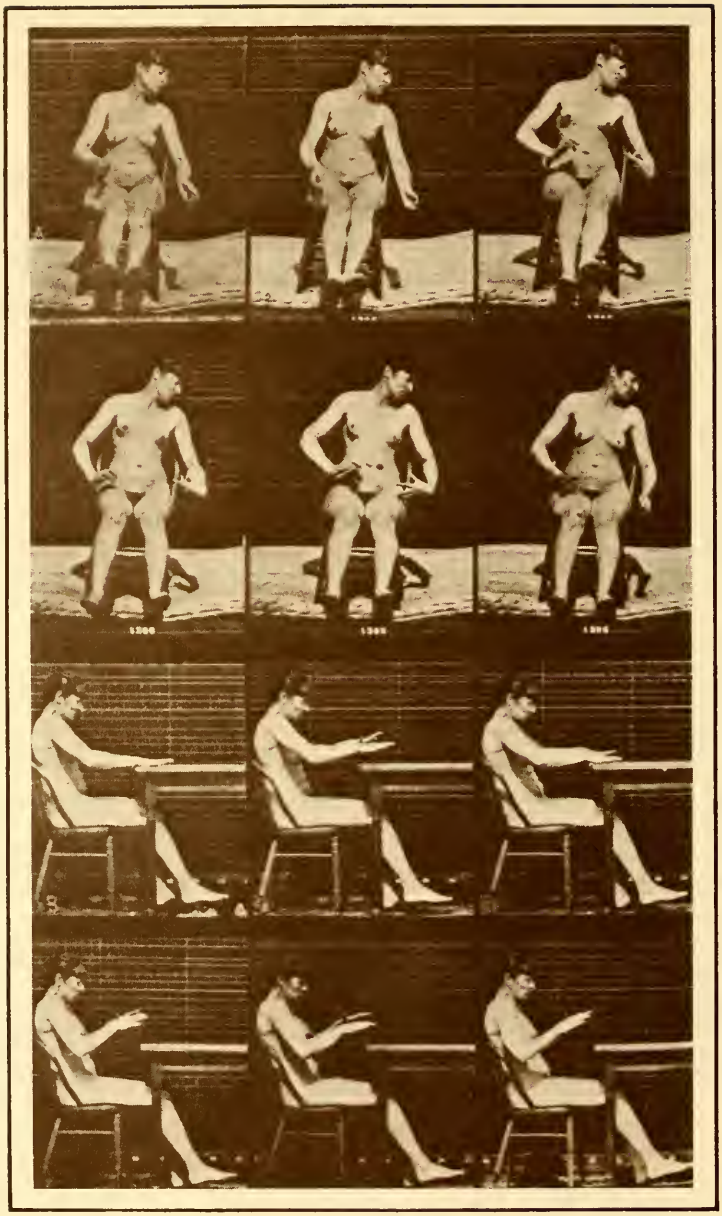
The studies of so-called "artificial convulsions" made on September 24, 1885, for example, were certainly Dercum's own idea, intended to provide a visual representation of the conclusions he had presented in his 1884 paper with Andrew Parker. Dercum selected one of the models who had taken part in Muybridge's female series, a Mrs. Cooper, who, he commented later, "was unusually intelligent and complied with the details of the experiment"—though in his first account of the work Dercum implied that her "indifferent or phlegmatic temperament" might have been important to its success.[17] He induced convulsions in his subject in the usual ways, by keeping her fingers as though in delicate contact with a table top or with her thighs. In the former case, Muybridge took serial photographs in the usual manner, but in the latter Dercum prevailed upon Muybridge to take photographs using a "Marey's wheel" so as to elicit a set of images all on a single plate, permitting a more direct comparison of the stages of motion. Although these latter photographs were not published in *Animal Locomotion,* and seem not to have survived separately, Dercum did reproduce one photograph in the account of the work that he published independently in 1888.[18]

While the work done with Mrs. Cooper was of course not truly pathological in character, a few weeks earlier—in July and August 1885—strictly clinical cases *had* been photographed by Muybridge. "At my request," wrote Dercum, "he photographed for me quite a large number of patients both from the nervous clinic of the University Hospital, of which I was then the chief, and also quite a number of patients from the Philadelphia Hospital. . . . There was at that time a small gate in the north wall of the Philadelphia Hospital and patients who had been selected by me were brought over to the studio by this means from time to time."[19] In all, twenty-one patients were photographed as they labored across the veterinary yard: children with amputations, polio, bowlegs, spinal caries; adults with gross motor disturbances—diagnosed as chorea, sclerosis, or locomotor ataxia—or suffering from scoliosis, melancholia, epilepsy, or hydrocephalus. Often an attendant is found standing near to guide or support them if need be. A twenty-second patient, afflicted with local chorea, was photographed standing and lying down;[20] and at least two other patients suffering from paralysis agitans were photographed using a "Marey's wheel."[21]

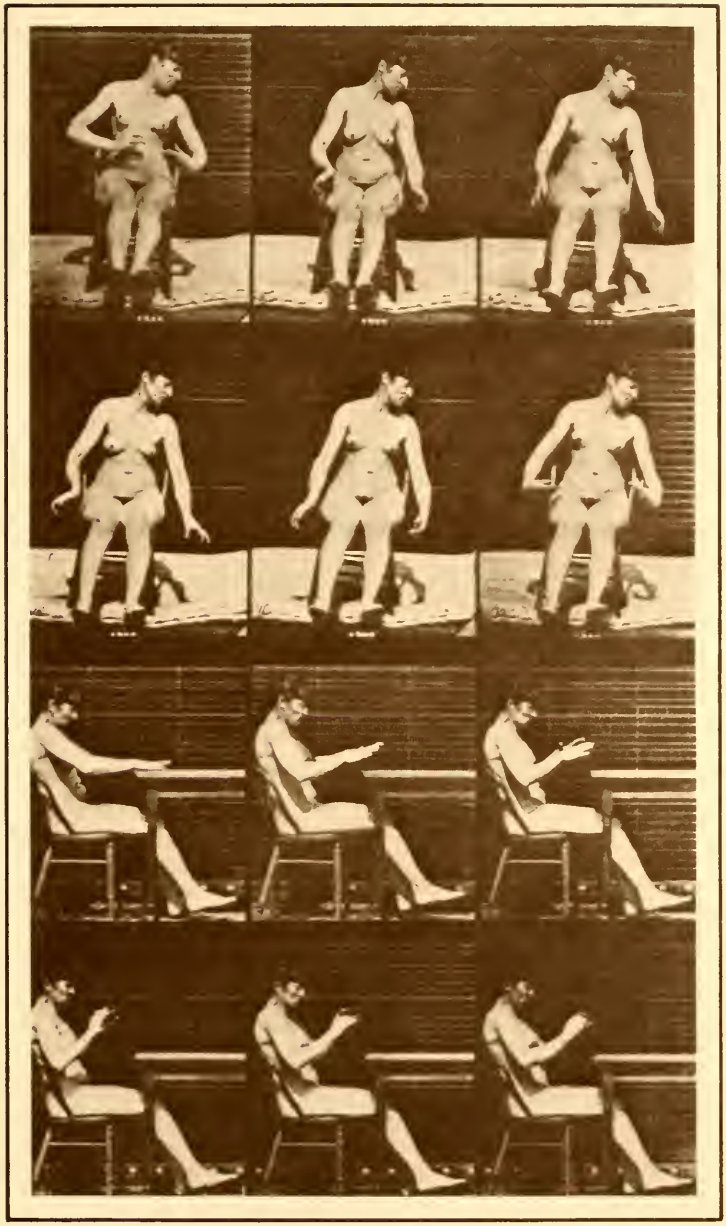
Dercum's comments just quoted make it clear that photographs were taken of patients not only from the new University Hospital (opened in 1874), but from the Philadelphia [General] Hospital, which had originated as the municipal almshouse and had been moved to the Blockley farm in West Philadelphia in 1832. Hence, as Dercum went on to remark, it had been necessary to gain permission to photograph from the Board of Guardians of



Muybridge plate 541 [detail]: Multiple cerebro-spinal sclerosis (choreic); walking. (From Muybridge's Complete Human and Animal Locomotion, *vol. II, p. 1092. Photo courtesy of University of North Carolina at Chapel Hill.)*



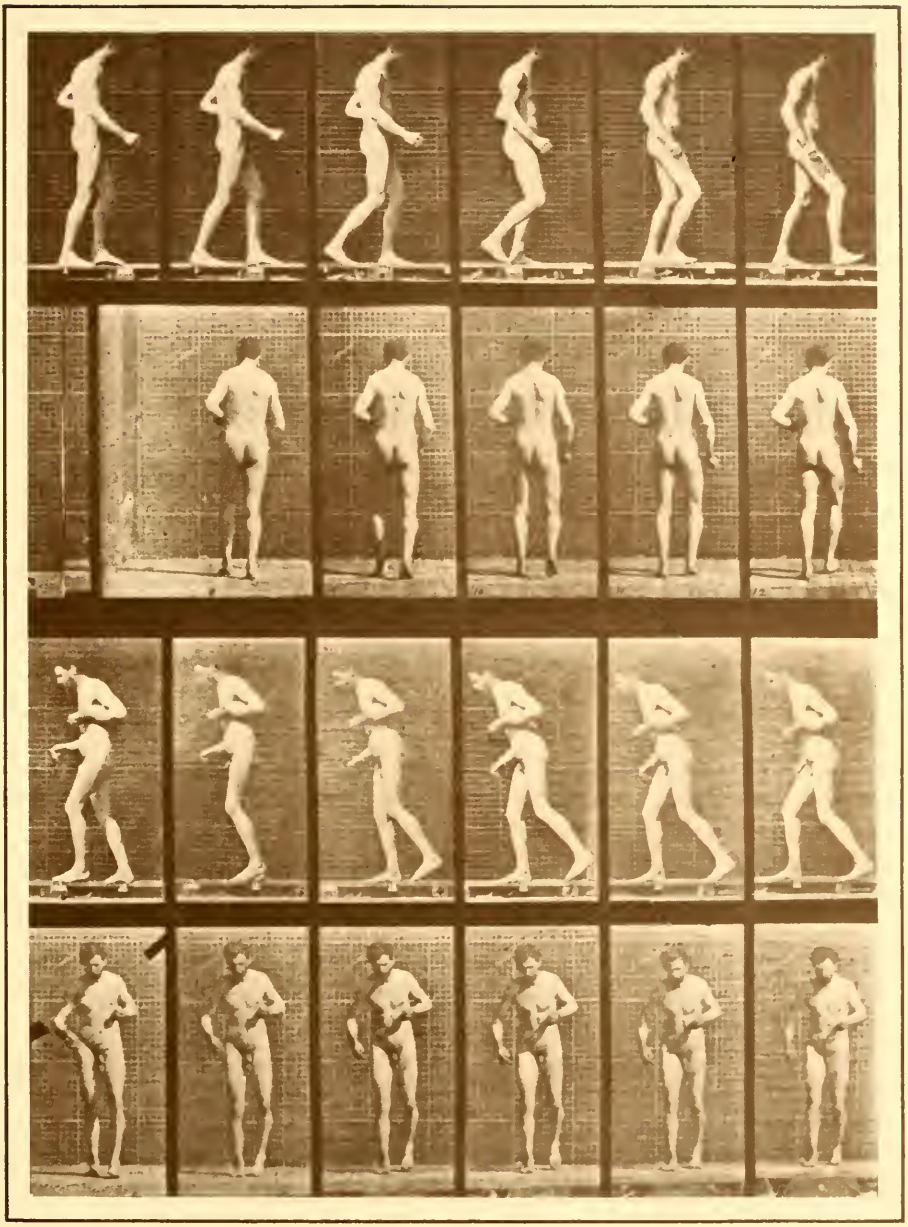
Muybridge plate 545: Artificially-induced convulsions; while sitting. (From Muybridge's Complete Human and Animal Locomotion, *vol. II, p. 1100. Photo courtesy of University of North Carolina at Chapel Hill.)*



the Poor. It is probably naive to assume that he also sought permission from the patients, or thought that their possible unwillingness to participate should be allowed to intrude into scientific research. Dercum also expressed his thanks to "Drs. S. Weir Mitchell, William Pepper, H. C. Wood, Charles K. Mills, and James H. Lloyd for the opportunity of photographing various patients under their care."[22] This is an interesting group, in which Weir Mitchell (long distinguished as a practicing neurologist, and a university trustee since 1875) is the exception: the others were much younger men, two of whom in particular—Pepper and Wood—had been active in the reform of the medical school that had taken place in the late 1870s.[23] Evidence suggests, nevertheless, that they all shared Mitchell's zeal for experimental medicine and so would not have hesitated to place their patients at Dercum's disposal.[24]

Someone else at the university who became deeply interested in the scientific potential of the Muybridge photography was Edward Reichert, professor of physiology, whose research focused upon the physiological activity of poisons. It was Reichert who persuaded Muybridge to join in photographing the "influence of certain poisons on the viscus," and the heart beat of a cat and of a snapping turtle (with its lower shell removed). Reichert kept the resulting negatives, and Muybridge seems to have made no prints. Thus, these first researches, which Reichert later qualified as "purely experimental and preliminary," were never reported, and Reichert never found time to take them up again. When he retired from Pennsylvania in 1920, Reichert destroyed the records of this along with the rest of his unpublished work.[25] By 1920, of course, photography of physiological function would no longer have been a novelty. Marey himself had been interested in the motions of the heart and their graphical representation since the outset of his career, and by 1892 he had carried out an experiment similar to that performed by Muybridge and Reichert five years earlier—photographing cardiac action in an (excised) tortoise heart under artifical circulation.[26]

Outside the university, too, there were signs that Muybridge's program was arousing the interests of the wider scientific community. The list of subscribers to *Animal Locomotion* announced in 1887 included some thirty scientists and physicians, among them Weir Mitchell, Pepper, and Wood, together with other practitioners from Washington to Boston. More surprising is the inclusion of such prominent scientists as zoologist Alexander Agassiz of Harvard, ornithologist Elliott Coues of Columbian College, paleontologist Othniel Marsh of Yale, and John Wesley Powell of the Geological Survey.[27] Their specialties suggest that representatives of the descriptive as well as the experimental and clinical sciences felt that the new technique could be of scientific value.



Muybridge plate 548 [detail]: Lateral sclerosis; walking. (From Muybridge's Complete Human and Animal Locomotion, *vol. II, p. 1106. Photo courtesy of University of North Carolina at Chapel Hill.)*

Muybridge's notebooks show that in September 1885, interspersed with the photographs of abnormal gaits, he was taking additional photographs of normal locomotion. It is with these late series that one might perhaps identify photographs of "healthy subjects" that Dercum later claimed he had ordered. These photographs are distinguished by showing subjects bearing markers by which the components of their motion could be plotted. In early series Muybridge had occasionally given his subjects a black cap with a white button to wear, the latter standing out against a dark graphed background and allowing some sort of dimensional representation of motion. In the photographs of September 1885, new techniques were introduced to allow a more precise description of gait: first, in addition to the white-buttoned cap, a vertical line painted down the subject's back;[28] then, a week later, a more sophisticated device, a belt supporting a white-tipped vertical wand (combining the functions of the cap and the painted line) as well as a white-tipped horizontal wand, which allowed the subject's movement to be analyzed into three dimensional components.[29] While there is no proof, it is possible to assume that Dercum imposed this apparatus on Muybridge to allow him to study normal gait as a control for the pathological cases.[30] Dercum's 1888 paper begins with a graphical analysis of the normal walk, although it adopts a different way of marking the components (by superimposing the successive photographs against the fixed graph background).

It is apparent that Francis Dercum was the pioneering figure in attempts to use photography or motion pictures to apply scientific analysis to the study of human locomotion, normal as well as abnormal. At the same time, however, it is important to remember that Dercum was a pioneer who soon gave up the wilderness for more cultivated territory. The analysis of normal motion in his 1888 paper was not developed further, and he never carried out any further studies on the subject. He apparently made no Zoopraxiscope disks to re-create gaits for medical students. The only later use that he seems to have made of his work with Muybridge was in his 1895 *Text-book on Nervous Diseases*, where he and other contributors reproduced photographs of four of the subjects in *Animal Locomotion*—but merely to illustrate abnormal movements: spastic diplegia, myelitis, lateral sclerosis, and locomotor ataxia.[31] In any case, by this time Dercum had shifted his main interest towards clinical neurology, psychiatry and philosophy. He had probably begun to lose his original enthusiasm for the camera as a research tool, perceiving the subject—or perhaps experimental medicine generally—as a dead end for someone of his own evolving interests. In this respect it is especially intriguing to read Dercum's cryptic comment in later years, speaking of the experimental work with Mrs. Cooper that had been one of his original professional enthusiasms, that "I need hardly [say] that

Fig. 198.

On observing the series from above downwards, the following phenomena are observed:—

1. The ventricle, *v*, has completed its systole, and has diminished in volume. The auricle, *a*, is full, enlarged, and shiny.

2. The auricle has commenced to empty itself and change its form; its external surface is flattened, and exhibits two irregular borders and a rounded extremity, giving it a tongue-like appearance. The ventricle is beginning to enlarge.

3. The auricle has diminished in size, and the extremity is approaching the ventricle; the latter is becoming still larger.

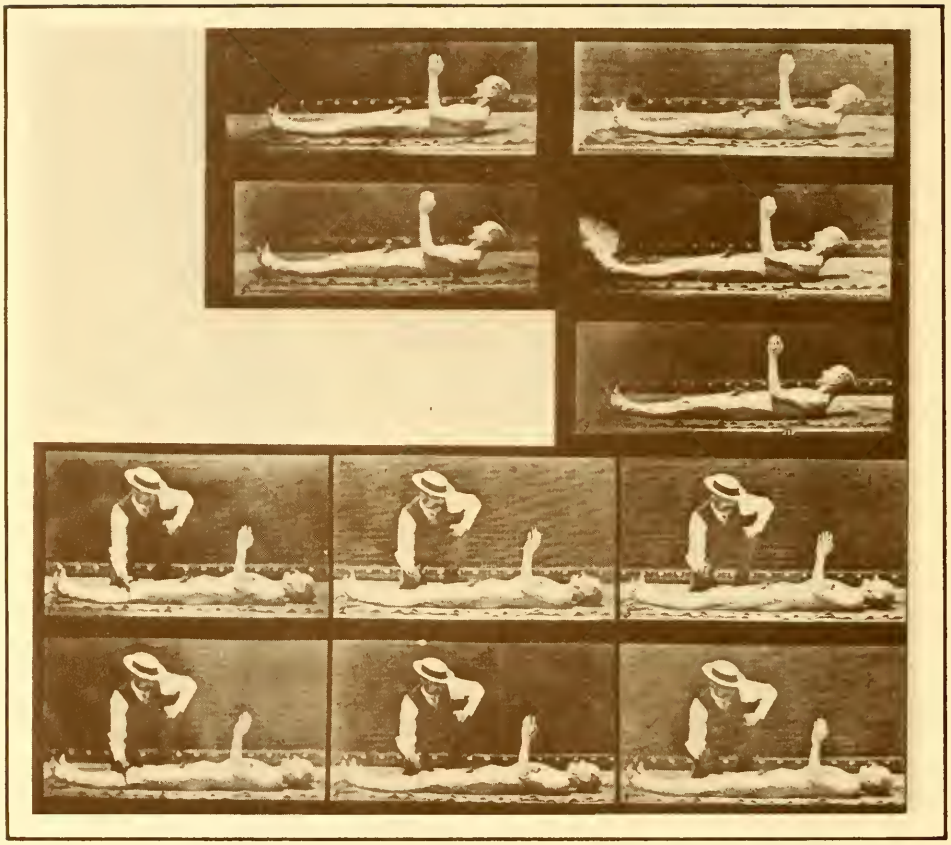
4. The auricle is still contracting, and the ventricle is approaching its maximum of repletion.

5. The auricle has completely emptied itself, and the ventricle is diminished in volume; its systole is commencing (at this moment the blood is being poured into the reservoir).

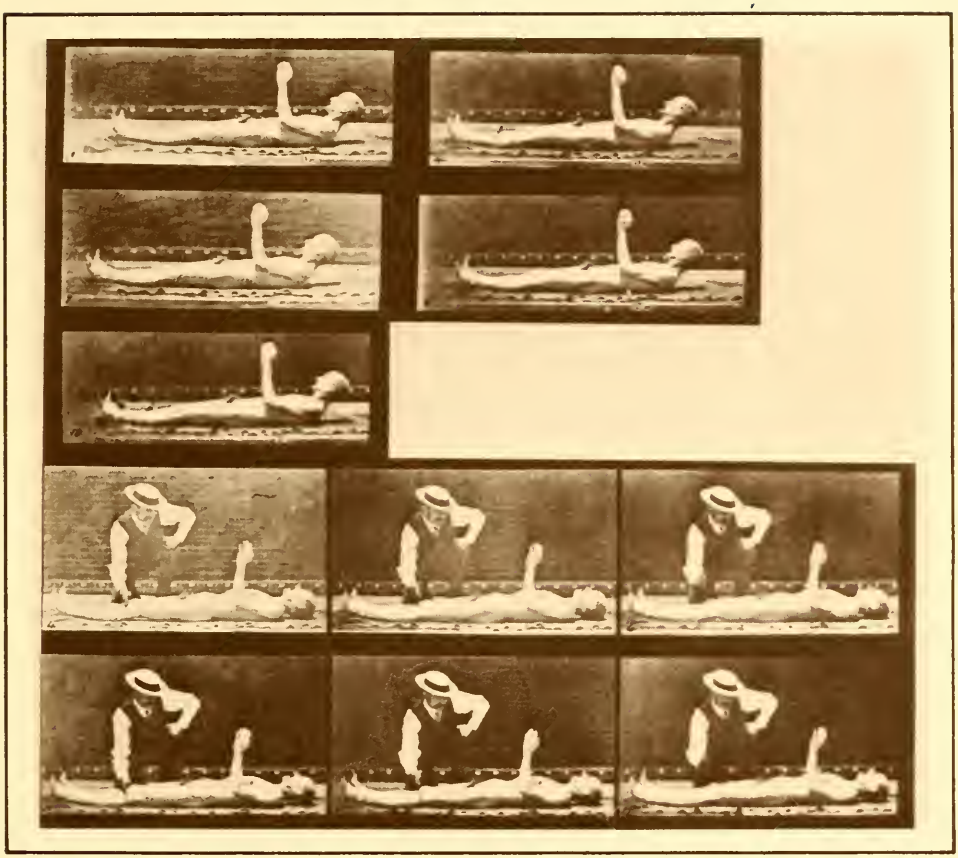
6. The ventricular systole continues, and the relaxed auricle commences to fill.

7. The ventricular systole is completed, the auricle is distended and shiny, and the phase represented in the first of the series is repeated.

"Chronophotograph" by Marey of a cardiac cycle. (From Etienne-Jules Marey's Movement, *London, 1895. (Photo courtesy of University of North Carolina at Chapel Hill.)*



Muybridge plate 556: Local chorea, while lying. (From Muybridge's Complete Human and Animal Locomotion, *vol. II, p. 1122. Photo courtesy of University of North Carolina at Chapel Hill.)*



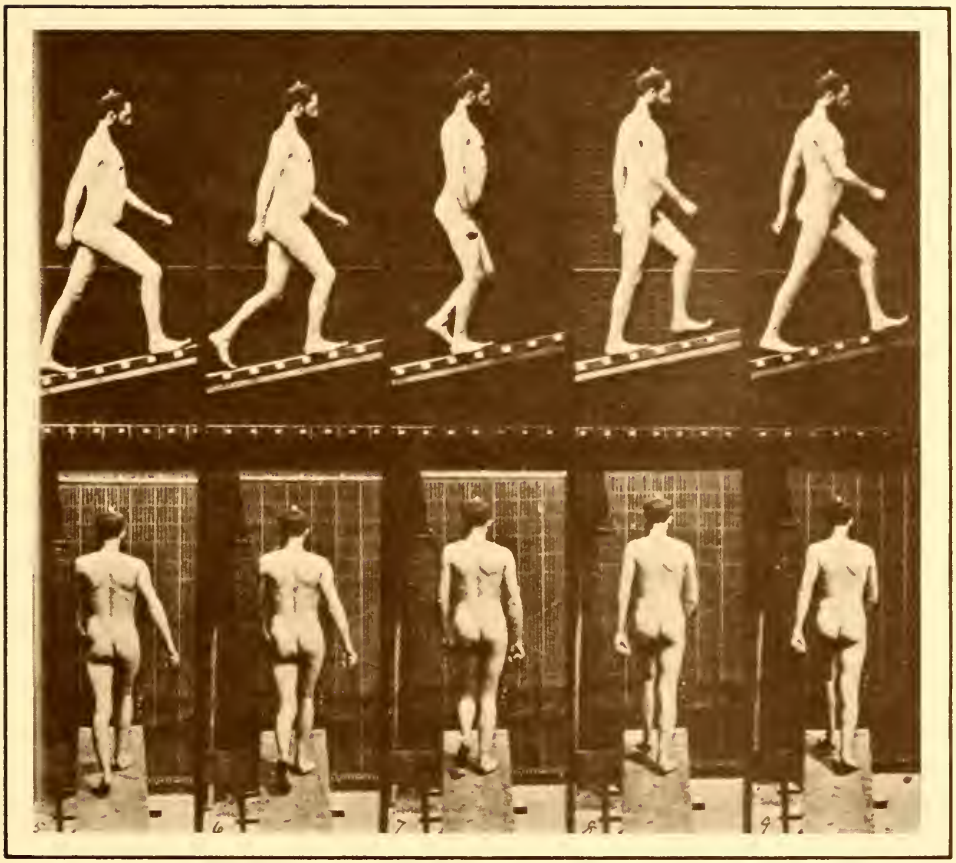
the artificial induction of convulsions came soon to be regarded by myself and friends as of such a nature that they were early discontinued."[32]

In the event, therefore, it was Jules Marey who became famous as the pioneering student of human gait through photography, using the "Marey's wheel" to record successive moments in a motion upon a single photographic plate in the same manner as Eakins had done, and as Dercum had arranged for Muybridge to do in 1885. It is intriguing to imagine what might have happened if Dercum had persisted in his original experimental program—not that Woodrow Wilson would necessarily have received different care without Dercum in attendance. As Muybridge's photographs inspired Eakins's naturalistic art, so Marey's later photographs of gait, taken of subjects dressed in black with white lines sewn on the clothing to furnish a more idealized representation, inspired the famous futurist painting, *Nude Descending a Staircase (2)* (1912), of Marcel Duchamp. Yet Marey's approach to idealization is in fact identical with that already employed by Dercum in photographing paralysis agitans.[33] If things had turned out only a little differently, therefore, Philadelphians would be able to look forward to celebrating the origins of futurism, too, in the year '87.[34]

NOTES

1. This paper originated in research done in a medical history seminar in the Department of Social and Administrative Medicine, University of North Carolina at Chapel Hill, for second-year medical students. A preliminary version was presented to the annual meeting of the American Association for the History of Medicine in Philadelphia on May 1, 1987.

2. I have based this study on the modern edition of Muybridge's classic work by Anita Ventura Mozley, *Muybridge's Complete Human and Animal Locomotion,* 3 vols. (New York: Dover Publications, Inc., 1979). Unless otherwise noted, all photographs in this article have been reproduced from this edition; in these cases, the captions are Muybridge's own.



Muybridge plate 75 [detail]: Ascending an incline. (From Muybridge's Complete Human and Animal Locomotion, *vol. I, p. 46. Photo courtesy of University of North Carolina at Chapel Hill.)*

3. These plates are discussed from the standpoint of aesthetics by Edward J. Nygren in *Eadweard Muybridge: Extraordinary Motion* (Washington, D.C.: Corcoran Gallery of Art, 1986), 10-28.

4. This account is based on the following sources: Charles W. Burr, M.D., "Memoir of Dr. Francis X. Dercum," *Transactions of the College of Physicians of Philadelphia,* 3rd series, *54* (1932): lxv-lxxi; Albert P. Brubaker, "Francis X. Dercum" [obituary], *Proceedings of the American Philosophical Society 71* (1932): 39-48; Tom Bentley Throckmorton, "Francis X. Dercum: Physician, Teacher and Philosopher," *Journal of Nervous and Mental Disease 96* (1942): 529-41.

5. Burr, lxx.

6. The peculiar terms under which the University of Pennsylvania granted a Ph.D. degree to about 100 men between 1874 and 1881 are explained by George W. Corner, *Two Centuries of Medicine* (Philadelphia: Lippincott, 1965), 126-27.

7. Francis X. Dercum and Andrew J. Parker, "On the Artificial Induction of Convulsive Seizures," *Journal of Nervous and Mental Disease 11* (1884): 579-588.

8. A good account of Muybridge's career is Robert Bartlett Haas, *Muybridge: Man in Motion* (Berkeley, Los Angeles, London: University of California Press, 1976); another, emphasizing his life after 1872, is in Mozley's edition of *Animal Locomotion.*

9. From Paris Muybridge went to London, where on March 13, 1882, he lectured to the Royal Institution of Great Britain on "The Attitudes of Animals in Motion, Illustrated with the Zoopraxiscope." He concluded his lecture with this statement: "The employment of automatic apparatus for the purpose of obtaining a regulated succession of photographic exposures is too recent for its value to be properly understood, or to be generally used for scientific experiment; *at a future time, the pathologist, the anatomist, and other explorers for hidden truth will find it indispensable for their complex investigations*" [my italics]. Eadweard Muybridge Scrapbook, Kingston-on-Thames Public Library, vol. 1, 79.

10. Information on Eakins's work that summer and on its relations with Muybridge's is taken from William I. Homer and John Talbot, "Eakins, Muybridge and the Motion Picture Process," *Art Quarterly 26* (1963):

194-216; Gordon Hendricks, *The Photographs of Thomas Eakins* (New York: Grossman, 1972), 6-8; and William Dennis Marks, "The Mechanism of Instantaneous Photography," in *Animal Locomotion: The Muybridge Work at the University of Pennsylvania* (Philadelphia: Lippincott, 1888), especially pp. 9-15.

11. Hendricks, 85; Homer and Talbot, 209-10. Homer and Talbot believe that the initial 'E' at the bottom of the plate means that it was annotated as well as taken by Eakins (see p. 211).

12. This information is found in the following correspondence: F. X. Dercum to Dr. Goodspeed, April 23, 1929; and F. X. Dercum to George E. Nitzsche, May 10, 1929 (University of Pennsylvania Archive).

13. Correspondence from Anshutz to J. Lurie Wallace (University of Pennsylvania Library), quoted by Haas, *Man in Motion,* 150.

14. See Muybridge's prospectus of early 1883: "An extended series of experiments will be made for accurately recording the successive attitudes, oscillations and movements of the human body in health and disease. These illustrations, I am assured by many eminent physicians and experimental physiologists, will be of immense service in harmonizing apparently contradictory facts, and of inestimable value to that large class of human beings suffering from bodily deformities and chronic diseases of the joints." Muybridge Scrapbook, vol. 3, 187.

15. Letter, Dercum to Nitzsche, 4.

16. Muybridge was quoted in the *New York Times* of August 16, 1885, as saying: "We propose to make a thorough analysis of the movements of birds and quadrupeds, and as I am neither a physiologist nor an anatomist, two Professors from the University of Pennsylvania are assisting in the work to give it additional weight and value. They are Dr. Francis X. Dercum, instructor on nervous diseases, and Dr. A. J. Parker, Professor of Comparative Anatomy and Zoology." Muybridge Scrapbook, vol. 2, 140.

17. Letter, Dercum to Nitzsche, 5.

18. Francis X. Dercum, "A Study of Some Normal and Abnormal Movements Photographed by Muybridge," in *Animal Locomotion: The Muybridge Work at the University of Pennsylvania.—the Method and the Result* (Philadelphia: Lippincott, 1888), 122-124. Also published as Francis X.

Dercum, "The Walk and Some of its Phases in Disease," *Transactions of the College of Physicians of Philadelphia,* 3rd series, *17* (1888): 308-338. See also Homer and Talbot, 207.

19. Letter, Dercum to Nitzsche, 2-3.

20. Christine Ruggere has informed me that the second man in plate 556, shown striking the patient below the knee, is in fact Dercum himself.

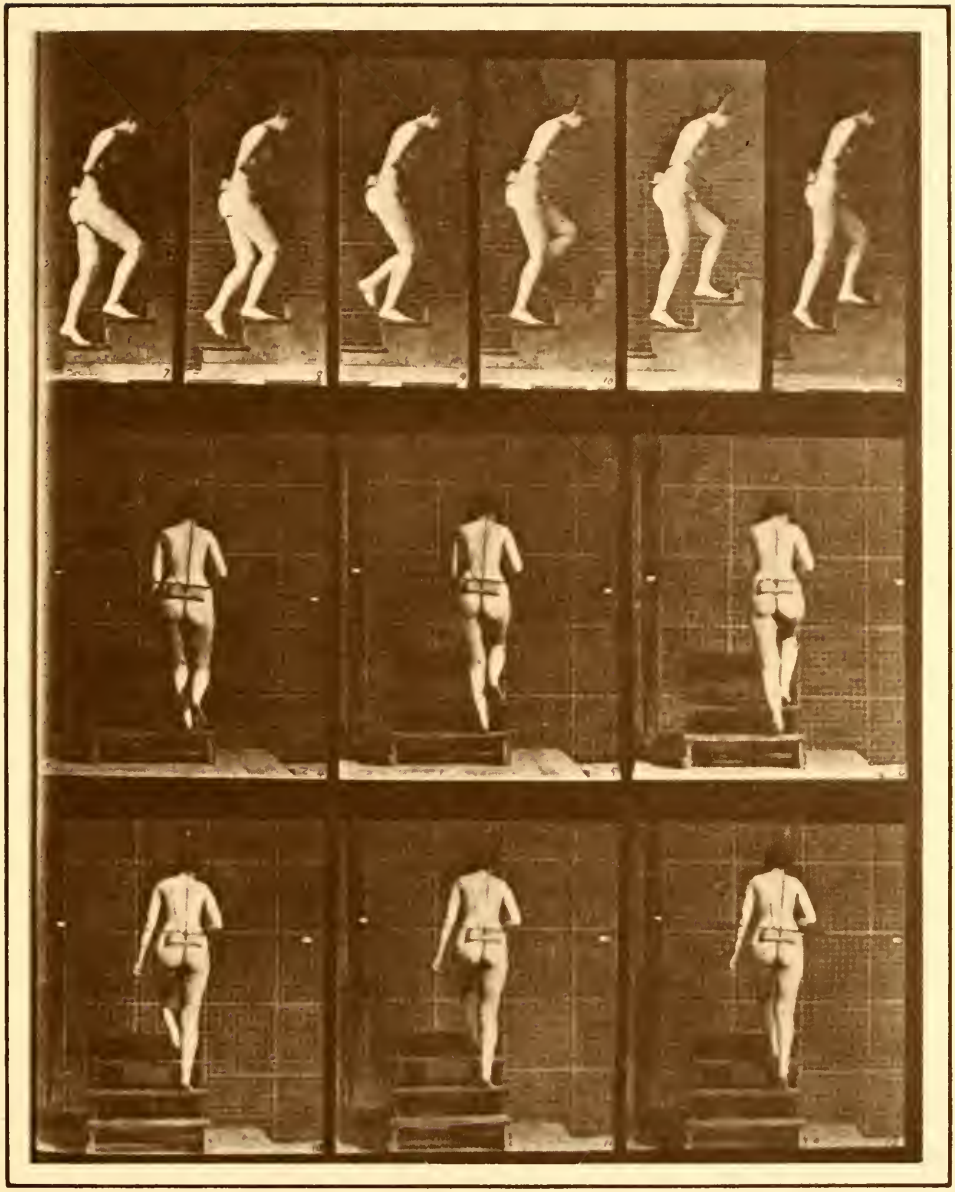
21. Francis X. Dercum, "A Study of Some Normal and Abnormal Movements," 130-133; or "The Walk and Some of its Phases in Disease," *Transactions of the College of Physicians of Philadelphia,* 3rd series, *10* (1888): 308-38.

22. Dercum, "A Study," 103. In most cases it is not possible to determine which physician had charge of the case, but plate 539 is Lloyd's patient; plate 548 is Pepper's (case history presented by Pepper in the Philadelphia *Medical Times* for October 31, 1885); plate 556 is Weir Mitchell's (discussed by him in "On Functional Spasms," *American Journal of the Medical Sciences 72* (1876): 328-29); and plates 541 and 550 are Dercum's own.

23. Corner, *Two Centuries,* especially chapters 8-9.

24. T. H. Weisenburg, "The Founders and Work of the Philadelphia Neurological Society," *Journal of Nervous and Mental Disease 42* (1915): 419-440, assesses the scientific achievement of Mills and Lloyd as well as that of Dercum. On Wood, see the memoirs in *Transactions of the College of Physicians of Philadelphia,* 3rd series, *42* (1920), especially 165-69 (by Dercum) and 175-86 (by Charles K. Mills).

25. This account is based primarily upon two letters now in the University of Pennsylvania Archives from Reichert to an unknown addressee, undated but evidently of 1929 (since Reichert, who was born in 1855, gives his age there as "74 years young"). See also H. L. Gibson, "The Muybridge Pictures of Motion," *Medical Radiography and Photography 26* (1950): 20, and Mozley, p. xxxi. Reichert does not suggest that Muybridge had any role in initiating these photographs, but it is possible that this was the case. Marey's *Circulation du Sang* was just being published at the time of Muybridge's visit to Paris in 1881, and Marey must have discussed with Muybridge the possibility of extending photographic methods to the study of the heart. This would explain why Muybridge's 1883 prospectus for *Animal*



Muybridge plate 93 [detail]: Ascending stairs. (From Muybridge's Complete Human and Animal Locomotion, *vol. I, p. 348. Photo courtesy of University of North Carolina at Chapel Hill.)*

Locomotion already held out the prospect of recording "the successive phases of the Heart and Lungs while in action" (quoted by Mozley, p. xxv), and at the very least explains why Muybridge was ready to ally himself with Reichert in their research.

26. Marey reported the work in "Le mouvement du coeur, étudié par la Chronophotographie," *Comptes Rendu de l'Académie des Sciences* (*CRAS*) *115* (1892): 485-90; see also Etienne-Jules Marey, *Movement* (London: W. Heinemann, 1895), 278-88. On Marey's career, see H. A. Snellen, *E. J. Marey and Cardiology* (Rotterdam: Kooyker, 1980), and *Dictionary of Scientific Biography IX,* 101-103.

27. Prospectus, dated October, 1887, in Muybridge Scrapbook, vol. 3, 173. None of these four scientists was listed in the earlier prospectus of January, 1887, reproduced by Mozley, p. xxviii.

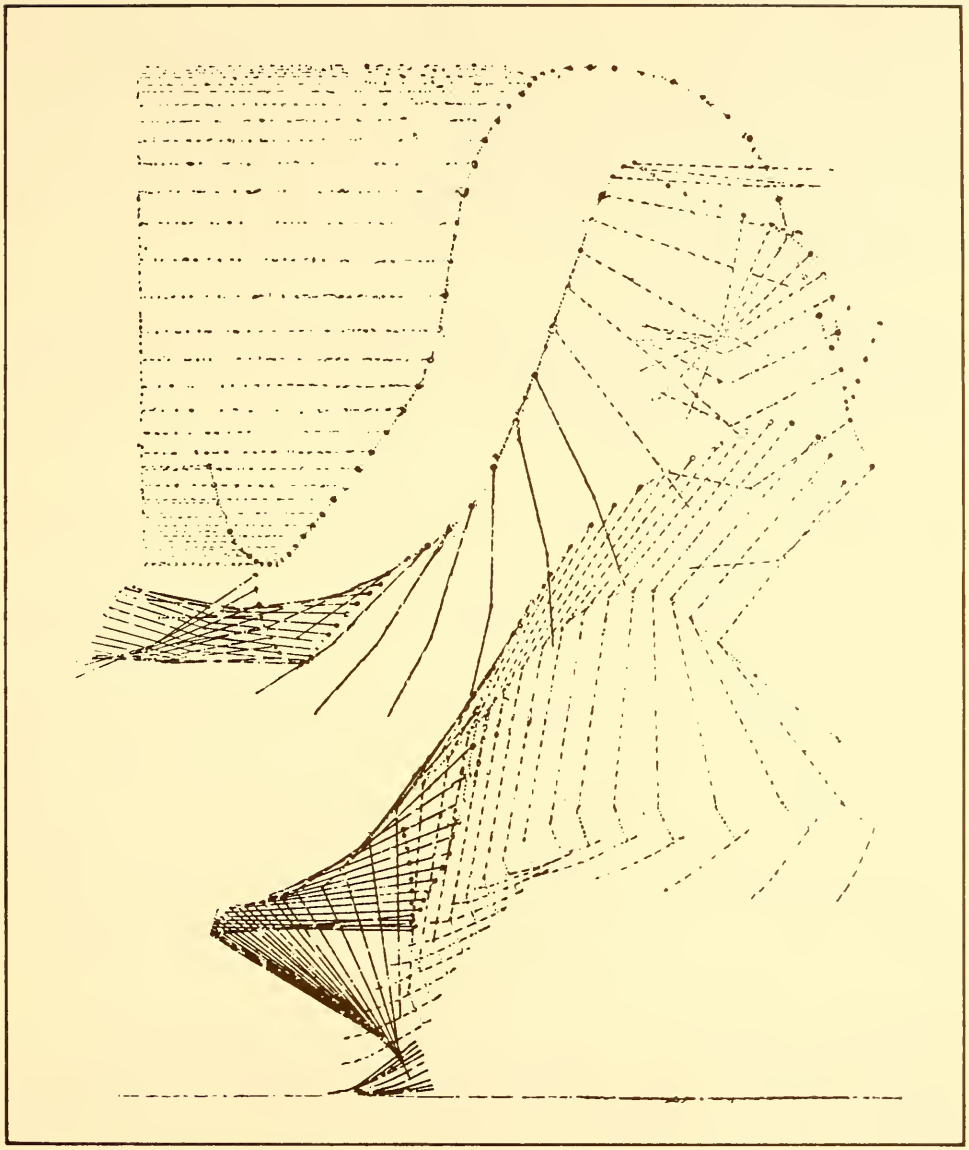
28. These photographs were taken on September 19, 1885, and are numbered 1365-1366 in Muybridge's "Notebook no. 4," which I have been able to examine through the courtesy of the International Museum of Photography in Rochester, New York. These numbers correspond to plates 25 and 34 in *Animal Locomotion.*

29. This series of photographs was taken on September 26, 1885, and is numbered 1429-1434 in Muybridge's "Notebook no. 4," where they are characterized as "showing movements of hips." These notebook numbers correspond to plate numbers 21, 20, 93, 130, 79, 118 respectively, in *Animal Locomotion.*

30. It may be this that Dercum had in mind when he thanked Muybridge for "the occasional adoption of methods not included in his original enterprise;" alternatively, he may have been referring to the introduction of the "Marey's wheel" to study pathological motion and artificial convulsions.

31. Francis X. Dercum, ed., *A Text-book on Nervous Diseases by American Authors* (Philadelphia: Lea Bros., 1895). Muybridge plate 541 is reproduced and discussed by Dercum himself in the *Text-book* (513-14); plate 559 by Morton Prince (labelled "partial paraplegia" by Muybridge but "chronic myelitis" by Prince, 571-72); and plates 548 and 550 by Frederick Peterson (629-30 and 635-36, respectively).

32. Letter, Dercum to Nitzsche, 5.



"Geometrical chronophotograph" by Marey of a jump from a height with flexion of the legs to break the fall. (From Marey, Movement, *Photo courtesy of University of North Carolina at Chapel Hill.)*

33. Dercum, "A Study," 131 (Figs. 24-25). Dercum here acknowledges his indebtedness to Marey for originating this manner of idealizing a motion. He may be referring to Marey's brief notes, "Emploi des photographies partielles pour étudier la locomotion de l'homme et des animaux," *CRAS 96* (1883), 1827-31, and "Analyse cinématique de la marche," *CRAS 98* (1884), 1218-25, both of which outline the technique in question. Thomas Eakins had tried a more primitive method of idealizing locomotion in his photographs of 1884, by sewing "bright balls" on a subject dressed in black clothes (Homer and Talbot, 209; Hendricks p. 7 [and cf. his plates 89 and 103]).

34. On the impact of the new photographic technique on subsequent painting, see Aaron Scharf, "Painting, Photography, and the Image of Movement," *The Burlington Magazine 104* (1962), 186-95. (See also pp. 391-92 in the same issue of the journal).

The author gratefully acknowledges the kind permission of Dover Publications, Inc., granted for the use of material from Anita Ventura Mozley's Muybridge's Complete Human and Animal Locomotion, *3 vols. (New York: Dover Publications, Inc., 1979).*

BIBLIOGRAPHY

Animal Locomotion: The Muybridge Work at the University of Pennsylvania. (Philadelphia: *Lippincott,* 1888.)

Dercum, Francis X. *A Text-book on Nervous Diseases by American Authors* (Philadelphia: *Lea Bros.,* 1895.)

Dercum, Francis X. "The Walk and Some of its Phases in Disease," *Transactions of the College of Physicians of Philadelphia,* 3rd series, *10* (1888): 308-38.

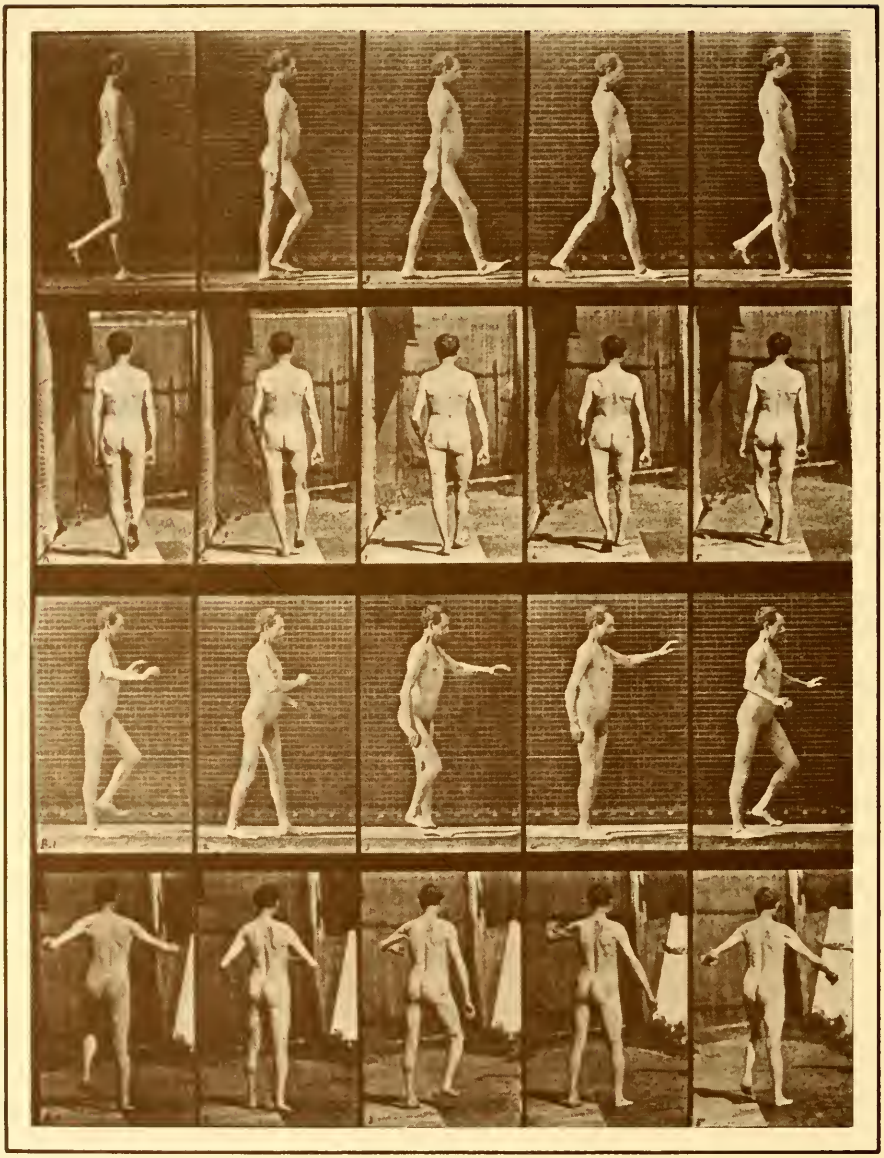
Haas, Robert Bartlett. *Muybridge: Man in Motion* (Berkeley: *University of California Press,* 1976.)

Homer, William I. and Talbot, John: "Eakins, Muybridge and the Motion Picture Process," *Art Quarterly 26* (1963): 194-216.

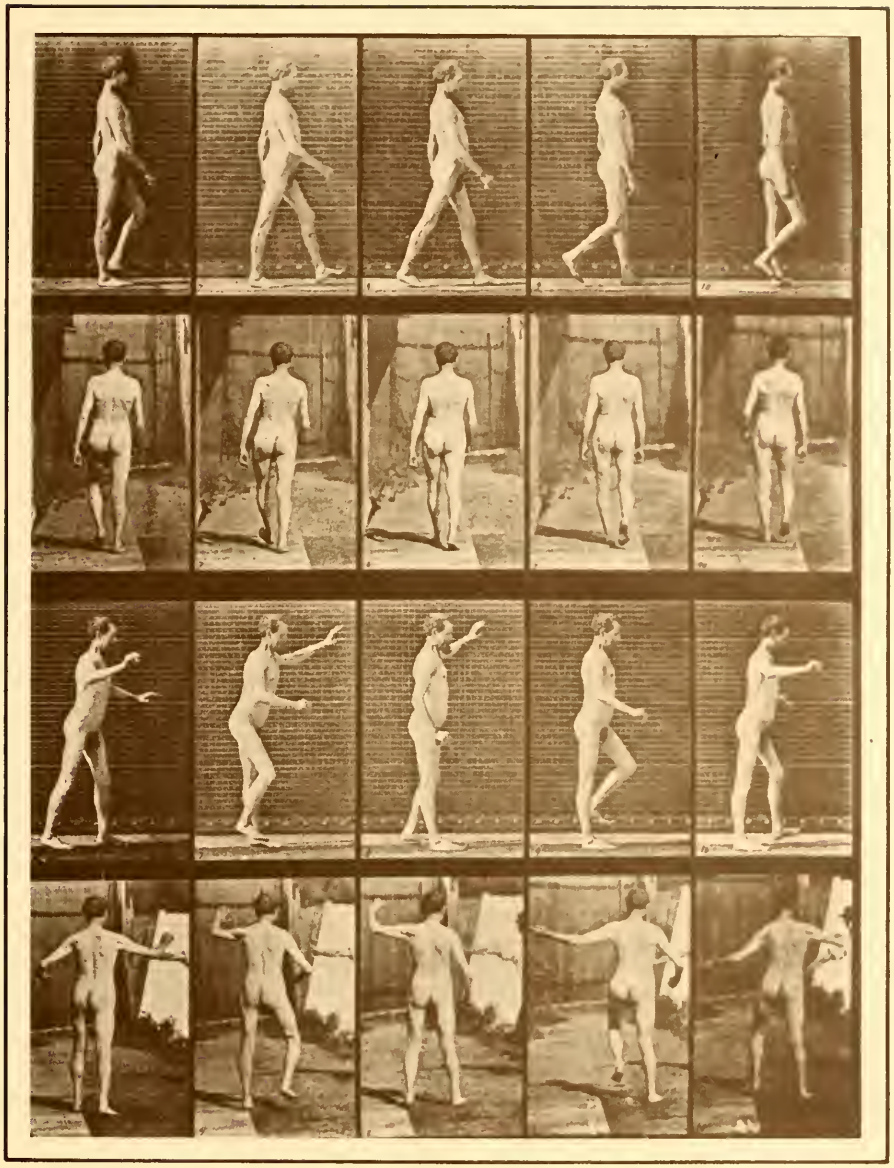
Marey, Etienne-Jules. *Movement* (London: *W. Heinemann,* 1895).

Mozley, Anita Ventura. *Muybridge's Complete Human and Animal Locomotion,* 3 vols. (New York: Dover Publications, Inc., 1979.)

Nygren, Edward J. *Eadweard Muybridge: Extraordinary Motion* (Washington, D.C.: Corcoran Gallery of Art, 1986.)



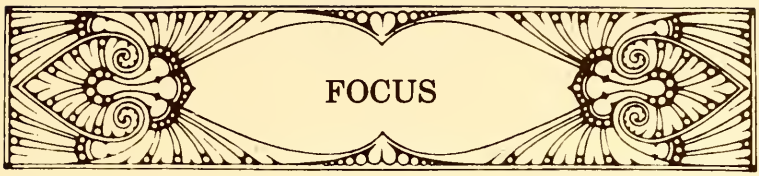
Muybridge plate 550: Locomotor ataxia, walking; arms down and arms up. (From Muybridge's Complete Human and Animal Locomotion, *vol. II, p. 1110. Photo courtesy of University of North Carolina at Chapel Hill.)*



Michael R. McVaugh was trained at Harvard and then Princeton as a historian of science and has taught that subject at the University of North Carolina since 1964, but for the last ten years he has worked at least as much in the history of medicine, where his research lies. Since 1980 he has been involved in the UNC medical school curriculum in a variety of ways, teaching first-, second-, and fourth-year students something about the history of their profession. His curiosity about Francis Dercum was piqued when he came upon the clinical photographs at the end of *Animal Locomotion,* but his long-term interests will continue to center on a much earlier age. Professor McVaugh is one of the editors of the medical writings of Arnald of Villanova, perhaps the most famous physician of the High Middle Ages, and is at work on a study of the medical culture of fourteenth-century Catalonia that takes him back regularly to Spanish archives.

Woman with paralysis agitans, photographed by Muybridge using a "Marey's wheel." (From Dercum, "A Study of Normal and Abnormal Movements." Photographed by Muybridge, in Animal Locomotion: The Muybridge Work at the University of Pennsylvania. *Photo courtesy of University of North Carolina at Chapel Hill.)*

The "Doctor's Office." Left to right: examination and surgical chair (A.P. Gould, Ohio, ca. 1900); phoropter (Wellsworth-DeZeng, ca. 1920); trial lens set (French, ca. 1890); ophthalmic cabinet; steam sterilizer (Rochester, N.Y., ca. 1900). Photo courtesy of Medical Museum, University Hospital.



The Medical Museum, University Hospital London, Ontario

by J. T. H. Connor

INTRODUCTION

The Medical Museum of University Hospital in London, Ontario, is one of the few permanently staffed institutions in Canada dedicated to the history of medical technology. That such a specialized museum exists in London is fitting, given the nature of the city. In general, activities associated with health-care delivery probably comprise the city's single largest "industry." London, which has a population of 280,000, is a national and international medical referral center. Major hospitals include University Hospital, a leading teaching and research institution affiliated with the University of Western Ontario; Victoria Hospital, Canada's largest general hospital; St. Joseph's Hospital, another major treatment and research center; several psychiatric institutions; as well as numerous other support-service and acute and chronic care facilities.

Moreover, London has been the site of significant contributions to the advancement of medicine and as such, the city offers a diversity of museums for those interested in medical history. One of the most important achievements came during the last quarter of the nineteenth century when Richard M. Bucke, Medical Superintendent of the London Asylum, advanced North American psychiatric methods through his advocacy of less physical restraint in treating psychiatric patients. Also during this period, Bucke formed a close friendship with American poet-philosopher Walt Whitman, who was to influence Bucke's work in the field of psychiatry and human cognizance. One of the fruits of this friendship was Bucke's book, *Cosmic Consciousness: A Study in the Evolution of the Human Mind*, which was

published in 1901. Many artifacts and documents relating to the history of psychiatric medicine, as well as reconstructed patient facilities, are on display in the museum at the present psychiatric hospital.

In 1920 London physician Frederick G. Banting devised the basic experimental protocol which eventually led to the discovery of insulin. The house in which he devised his plan is now being restored through the auspices of the Canadian Diabetes Association and will be developed into a museum devoted to Banting's life and research activities.

In the 1940s Dr. Murray L. Barr's research at London's University of Western Ontario culminated in the discovery of the sex difference in body cells. This discovery, called the *Barr body,* led to the description of several sex chromosome abnormalities.

THE MEDICAL MUSEUM, UNIVERSITY HOSPITAL

The idea for a medical museum evolved from the like interests of a group of prominent, local physicians and so it was only natural to have made this museum an integral part of University Hospital when the hospital opened in 1972. Owing to its location on the ground floor of the hospital, the Medical Museum is conveniently situated for visitors, patients and staff. The museum curator is responsible for all aspects of the museum's operation and for developing an archives for University Hospital and its predecessor (a tuberculosis sanatorium that operated from 1910 until 1972). The current curator's educational background includes an undergraduate degree in science and post-graduate degrees in the history of medicine. The position is that of a permanent part-time employee of the hospital.

In the museum's two exhibition areas are more than 500 individual artifacts and documents which illustrate the state of medicine during the nineteenth and early twentieth centuries. The first area is a carefully recreated Victorian doctor's office, where artifacts are presented in their natural setting. In this room visitors can begin to appreciate the basic principles and procedures of general medical practice during the period. An examination of medical tariffs and doctor's cashbooks, prescription books and other documents relates important details of contemporary medical economics and procedures. Similarly, display of pharmaceutical artifacts introduces visitors to the basic *materia medica* of nineteenth-century medical practice, including various methods of preparing and dispensing prescriptions.

Other aspects of general practice are also exhibited. Surgical and obstetrical kits, various diagnostic devices, bacteriological and other laboratory

The "Doctor's Office." From left to right: table supporting various surgical instruments (mid-nineteenth century), including vaginal and rectal specula; amputation kits; and tonsillectomy guillotine. Side table contains "Lister" antiseptic (carbolic acid) sprayer (ca. 1880); gauze anesthetic mask and chloroform drop bottle (early 1900s). Midwifery kit (ca. 1870s) and assorted wooded splints are located on the couch. Side chair supports a wooden articulated prosthesis (1901) and saddlebag medicine kit (1892). Photo courtesy of Medical Museum, University Hospital.

Partial view of second museum exhibit area. Far left illustrates a "Hindle" ECG apparatus (1937); lower center, Sanborn Metabulator (1940s). Case to left: top—ophthalmoscopes 1850s to 1940s; middle—monaural stethoscopes; lower—"Simplitrol" ECG (1945), McKenzie polygraph (ca. 1900), and Dudgeon Sphygmograph (ca. 1890s). Case to right: top—medicated atomizer (ca. 1870); middle-assorted bloodletting devices; lower—pharmaceutical chests (early 1800s) and radium transporter (ca. 1920). Photo courtesy of Medical Museum, University Hospital.

apparatus in use in the last century all help to acquaint visitors with the strengths and limitations of medical practice of a few generations ago.

All artifacts are easily viewed at close range. Low-level incandescent lighting in period fixtures provides the subdued atmosphere of an earlier era and representative period furnishings and decoration further enhance authenticity and appeal. (Most furniture items were used in London-area doctors' offices.) Within its limited scope, then, the "doctor's office" achieves several of the goals of "living history."

The second exhibition area contrasts with the "doctor's office" in its more formal museum structure. Here, display cases present more recent examples of medical technology, such as ECG apparatus; sphygmomanometers and sphygmographs; ophthalmoscopes; devices for urine and blood analysis; electrotherapeutic equipment; and cathode-ray tubes. Also exhibited in this area are numerous examples of varying designs of stethoscopes, microscopes, midwifery forceps, syringes, bloodletting equipment and balances. From this diversity of instruments a sense of the scope and development of medical technology is conveyed to visitors.

Because of the limited area of the exhibition space (a total of 400 sq. ft.), rotating exhibits are not feasible. Possible joint exhibitions with the city's main historical museum and with London's Children Museum, are currently under discussion, however. Since fairly confined conditions inhibit using recommended exhibition practices, the museum, especially the "doctor's office," tends to be over-crowded with artifacts. Interestingly, visitors do not seem to consider these conditions a problem. Indeed, the "organized clutter" of equipment in the doctor's office is undoubtedly more representative of prevailing contemporary practices than the pristine layouts often found in other historical recreations.

To be sure, the medical museum's exhibition layout and collection do not compare with major North American history of medicine museums. However, museums perform other functions. In the areas of education/interpretation and research/professional development, University Hospital's Medical Museum is fairly strong. For education/interpretation, three distinct audiences are addressed. The first audience is the general public, which comprises the bulk of the museum's visitors and consists primarily of patients (both admitted and outpatients), visiting family members and friends. While this is an educationally and socially heterogeneous audience, a common factor in the group is a heightened awareness of the role of medical technology prior to an initial visit to the

museum. Owing to recent personal health-care experiences, these visitors are readily receptive to and appreciative of information concerning the development of medicine and related technology. Since a significant proportion of these visitors have been exposed to the latest "high-tech" equipment in other areas of the hospital, they are quick to grasp advances made in the field of medical technology. For example, discussion of radiology in the early 1900s or electrocardiography of only fifty years ago becomes much more meaningful to a patient-visitor who has recently undergone a CAT scan, a magnetic resonance image scan, or a heart transplant. Often fairly esoteric knowledge can be conveyed to a wide audience in a short space of time, imparting both an enjoyable and meaningful experience.

The second audience for the museum comprises the clinical and professional support staff in the hospital. Since professional staff are highly motivated and technically specialized, they present interesting challenges for the museum education/interpretation function. While staff do visit the museum individually and with pre-arranged departmental tours, clinical personnel usually are reached by the museum going to them. In consultation with key members of clinical departments, the curator sets a time for presentations dealing with the development of a specific discipline as illustrated through relevant artifacts. For example, members of the hospital's Department of Microbiology gathered for a session in the museum regarding such topics as the evolution of antiseptic/aseptic theory and practices and their impact on hospital design and construction, and on subsequent instrument manufacture. Use of artifacts such as a Lister sprayer, or of ebony- and ivory-handled surgical instruments versus later sterilizable instruments were among the topics of historical interest which were easily and usefully integrated into the discussion. In effect, presentations of this type become a form of "internal" extension education service or "domestic" travelling exhibit.

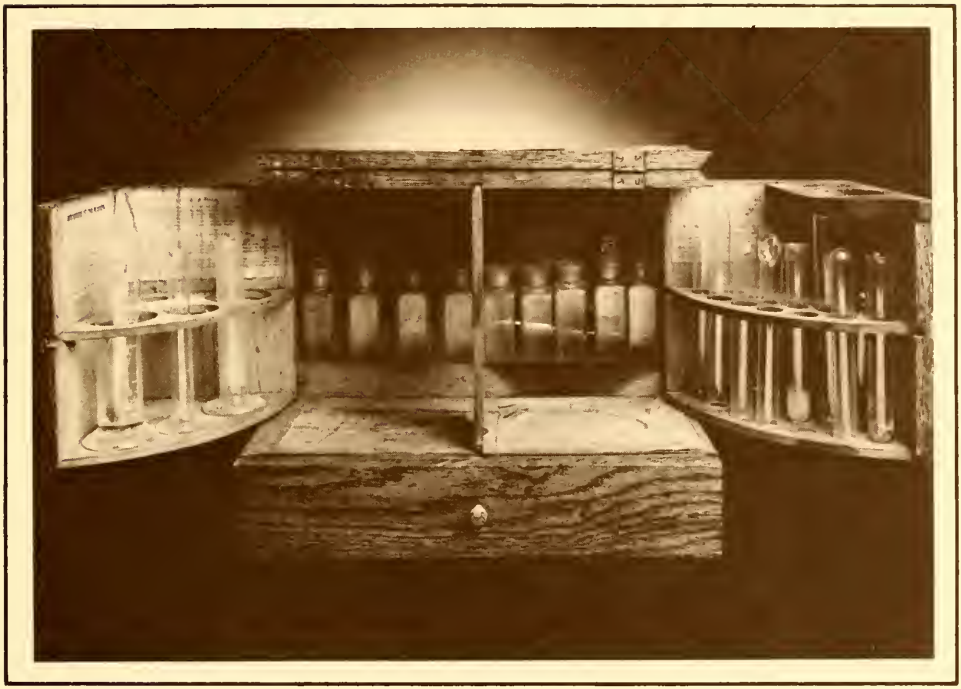
University students constitute the final group within the museum's education/interpretation program. Through the curator's faculty appointment in the Department of the History of Medicine and Science at the University of Western Ontario, survey courses in the history of medicine and technology are supplemented by tours to the museum, formal lectures, and study of the artifacts. In this way students can better appreciate the development of medicine, especially in the nineteenth century, by examining the material history of the discipline in addition to more traditional printed documentary sources. In the future, it is possible that a course will be designed in the history of medical technology, focusing on the study of the instruments themselves, in conjunction with readings from the increasingly sophisticated historical literature. Plans are also being considered to

The "Doctor's Office." General exhibit of pharmaceutical products and artifacts. Desk to right supports account books and prescriptions, and a schedule of medical fees dating from the 1890s; Western University Medical School graduating class photograph of 1895-96; and urinalysis kit. Photo courtesy of Medical Museum, University Hospital.

acquaint high school students with the museum through already existing hospital-school liaison programs.

The research/professional development function of the medical museum is also quite strong and falls into three categories. One major project under way is the writing of an illustrated history of University Hospital and its sanatorium predecessor, an endeavor which will utilize the extensive archival material currently housed in the museum. Publication of this work is scheduled for early 1988. A second area of research relates more directly to medical technology: an extensive bibliographic guide to the historical sources of medical technology has just been completed and may be purchased directly from the museum. Other monographs, including a *catalogue raisonné* of the museum's collection and historical reprints are also planned. Likewise, recent research publications on the development of medical technology in Canada have also originated from the museum. Audiovisual presentations, such as a videotape of the development of radiology in Canada prepared with the Canadian Association of Radiologists and a major drug company, have also been produced. Finally, in the field of museology, current projects include the preparation of a review and a guide to medical exhibits and museums in Ontario, and the production of the Medical Museums Association Newsletter—*The Prescription.* The museum is also represented on the Board of Advisors of the health science museum quarterly, *Caduceus.*

University Hospital's Medical Museum, then, is a small but active operation. Although larger and more complete institutions exist, this medical museum serves well the community of which it is a part. Its unique location within a major hospital allows for numerous interesting opportunities and challenges which, coupled with the support it receives from senior administration, make it a rewarding experience for both visitor and curator alike.



Urinalysis kit with oak cabinet open (ca. 1900). Originally contained reagents that allowed up to 18 qualitative and quantitative tests to be performed, including determination of bile, sugar, albumen and pus in urine. Photo courtesy of Medical Museum, University Hospital.

THE MEDICAL MUSEUM, UNIVERSITY HOSPITAL

Curator: J. T. H. Connor

Location: Main floor, University Hospital
339 Windermere Road
London, Ontario, Canada N6A 5A5
(120 miles from Detroit on Highway 401;
120 miles from Toronto on Highway 401)

Telephone: (519) 663-3120

Hours: Tuesday-Thursday (9:00 am - 5:00 pm)

Admission: Free

University Hospital, London, Canada. Owned and operated by the London Health Association, the hospital was founded in 1909. This present building was constructed in 1972. Photo courtesy Audiovisual Services, University Hospital.

Eric T. Pengelley and Daphne M. Pengelley, A Traveler's Guide to the History of Biology and Medicine, *Davis, CA: The Trevor Hill Press, 1986. (Paperback, 231 pages + index. $14.00)**

Through their *Guide*, Eric and Daphne Pengelley seek "to bring before the interested reader not only major people and events in the history of biology and medicine (commonly overlooked in general history and guide books), but also where to find the various places, buildings, artifacts and other memorabilia, associated with them."

Eric Pengelley, a specialist in physiology and the history of biology, is professor emeritus at the University of California at Davis. From time to time he presents lectures in the history of medicine to medical students at Davis. His wife, Daphne, is an artist. He was born in Toronto and she in Surrey, England. They have both authored and published this *Guide.*

The book is organized by country: Britain (covering museums, libraries, botanical gardens, even a pub or two, in twenty-five towns or cities), France (six cities), The Federal Republic of Germany (ten sites), Italy (four), Switzerland and Sweden (three each), Austria, Czechoslovakia, Hungary and Holland (one each), the United States (seven), and Canada (three).

For many of the sites, the authors provide an historical explanation for their importance in biology and medicine. An occasional description informs the reader about the focus for collecting, the strengths in holdings and the physical layout. Directions are provided for traveling to all sites by train or car. Addresses, telephone numbers, hours and admission charges are also provided.

**A Traveler's Guide to the History of Biology and Medicine* is available from The Trevor Hill Press, P.O. Box 1851, Davis, California, 95617-1851.

The strength of the *Guide* is coverage of sites in Britain (to which nearly half of the book is devoted), France and Germany. The weakness is coverage of sites in North America. It would probably have been better if the authors had not included the chapters on the United States and Canada at all. Coverage is woefully incomplete and descriptions of the sites which are mentioned are minimal. The authors' treatment of North American museums is understandable, however, given the poor job most of us are doing in informing both scholars and the public of our existence. Indeed, when I think that the authors set about their task with the intention of finding medical museums and found only the few they note, what must it be for the less determined and talented?

We are all in the debt of the Pengelleys for organizing the most complete guide yet in print of European sites of biological and medical interest. It will be a help to any traveler and it stands as a challenge to staff of North American institutions to come forth with at least as comprehensive a guide.

Glen W. Davidson

Eric T. Pengelley
Daphne M. Pengelley

We have been fortunate in that we have been able to travel much in our lives. During our journeys we have tended to hunt out the "unusual," well off the beaten tourist tracks. This preference, coupled with our chosen fields of biology and art, prompted us ten years ago to undertake the compilation of a guide book to places of historical interest in biology and medicine. Although we had no experience on the subject, we felt somewhat confident in that apparently no one else had either. We would be virtually embarking on a novel endeavor, hampered a bit by our decision only to travel and work on this project as time and money allowed.

THE SCOPE OF OUR GUIDE

In compiling information for our guide, our preference was to have covered the whole time span of medical history, which goes back to about 3,500 B.C. in Egypt and even earlier in China. Ancient writings confirm that the operation of trephination is at least 11,000 years old, and certainly there were Greek military physicians at the siege of Troy (circa 1184 B.C.). The Romans also had their doctors, albeit nearly all Greek in nationality because Romans considered the practice of medicine beneath their dignity. Likewise, the Moslem Arab civilization, which in 1000 A.D. stretched from Spain to India, contributed much to developments in medicine, particularly in the field of pharmacology. In fact, the very word "drug" is of Arabic origin.

There are many surviving artifacts from the practice of medicine, most notable of which are such treasures as the famous Ebers papyrus (a treatise mainly describing the treatment of diseases) and the Edwin Smith papyrus (a treatise on surgery). These two items from Egypt date from about 1600 B.C.

Although we had considered attempting to explore the Middle East for places and items of medical interest, we decided against it for practical reasons, lack of time, money and our general unfamiliarity with the area.

COLLECTIONS IN EUROPE

We chose to concentrate the largest part of our effort on an analysis of the holdings in European museums—where much of medical history began. We made an arbitrary decision to restrict our time span to no earlier than the sixteenth century, when in 1543 Andreas Vesalius published his anatomical treatise entitled *De Humani Corporis Fabrica.* (Although the anatomical drawings of Leonardo da Vinci preceded, and are superior to those of Vesalius's prominent illustrator, Stephan van Calcar, these drawings unfortunately were never published and so had virtually no influence on the medicine of their day.)

In an attempt to find out what might actually exist and where, we wrote dozens of letters of inquiry to various European friends and colleagues. Sometimes we just wrote to "Le Marie" or "Der Bürgermeister," but were careful to translate our letters of inquiry into the appropriate languages before sending them. This extra effort on our part usually brought a response. It soon became apparent that the best sources of information were the local librarians, and they were nearly always very cooperative. It helped enormously if we tried to speak in their languages, and since we both speak a little French and German we got along well enough. Obviously, though, it was to our advantage when they spoke English, as many of them did. All in all we found these librarians to be very knowledgeable people.

We were careful to have come prepared for our venture and so had read an enormous amount of background material prior to our arrival. One source we found to be particularly helpful was the *Dictionary of Scientific Biography,* edited by Charles Coulston Gillispie of Princeton University (New York: Charles Scribner's Sons, 1980). This dictionary should be the standard reference work on the subject well into the next century.

Needless to say, we relied on more than formal appointments and visits to museums in our project. We kept abreast of information gleaned informally also, and were quick to inquire from anyone who could possibly help us. While being careful to respect the privacy of others, we nevertheless had to be persistent at times. When appropriate, we wrote or telephoned in advance for an appointment. With this courtesy, we were able to have interviews with some particularly interesting people—for example, the late Dr. Charles Best, one of the codiscovers of insulin; Dr. Francis Crick of DNA fame; the late Dr. Anna Freud, the daughter of Sigmund Freud; and Lady Nora Barlow, a granddaughter of Charles Darwin. (We also got ourselves into some very special places, including Queen Elizabeth II's private library at Windsor Castle.)

In our experience it became apparent that with genuine interest, a background of appropriate knowledge, and the patience and politeness expected of visitors, museum collections nearly everywhere proved readily accessible. (It probably also helped that we were able to visit under the aegis of the University of California.)

Our traveling and site visits in Europe covered several years and the following countries: Britain, France, West Germany, Italy, Switzerland, Austria, Czechoslovakia, Hungary, the Netherlands and Sweden. In no way do we consider that these countries are the only ones with places and items of interest in the history of medicine, but their collections certainly do predominate. We determined that we would accept no secondhand information if at all possible; in fact, with two or three exceptions everything described in our guide was personally viewed and often photographed. The guide includes detailed directions as to how to reach the various places described, and helpful information on both road and rail travel are provided. Sometimes, after a particularly long day exploring in a strange place and conversing in a foreign language, it took an extraordinary amount of self-discipline to write up our findings the same evening. In the end, though, our effort was worth it.

While it behooved us to try and visit as many places and collections as possible pertaining to the history of medicine, our copious notes made it a monumental task to decide what to include in our guide. A lot of collecting of medical artifacts has been done by private individuals, and we made the decision not to include these personal collections because we feel privacy should be respected. Throughout Europe it is common to find numerous small displays of old medical instruments. Many of these items are grim in nature and often poorly kept and unlabeled. Favorite items in this category seem to be obstetrical forceps and early metal enema syringes. Likewise, there are many "apothecary shops" which have been partly restored and which recreate some of the former atmosphere. Unfortunately, there is of those places little real information as to their nature and how these shops fit into the scheme of daily living. In the main we have not included such places.

We must stress the fact that the size of the displays *per se* was not a consideration, but rather we chose to weigh their importance for the development of medicine with the professionalism with which they were displayed. For example, the displays in the physics department at the University of Würzburg in West Germany are tiny, but they contain the first x-ray photographs ever taken by Wilhelm Röntgen, and a commendation to

Röntgen from the German Physics Society signed by Max Planck and Albert Einstein. In addition everything is carefully labeled and explained, albeit only in German.

Other examples abound. In contrast to the Röntgen exhibit, the Apotheken-Museum at the Schloss in Heidelberg with the range of artifacts spanning virtually the whole history of the art of the apothecary. The exhibit is beautifully displayed, kept and explained, and in our opinion is the best we have seen. The quality of this museum's holdings fit well the criteria we developed for inclusion—namely that the collection have some real importance in the history of medicine or biology, and/or that the displays be kept and explained.

It is difficult to single out which medical museums are better or worse than others, because they are all different and specialize in different things. For example, the Josephinum in Vienna specializes in collections of anatomical and obstetrical wax preparations and its displays relative to these subjects are superb. Also noteworthy in this museum are exhibits such as the one showing the development of ophthalmology.

In France the Musée Claude Bernard in St. Julien-en-Beaujolais is devoted solely to the many discoveries of Claude Bernard. (Incidentally, this museum and others in France are under the directions of Madame Jacqueline Sonolet who is a "master of the art.")

At the other end of the spectrum is the Wellcome Museum of the History of Medicine within the Science Museum in London. The Wellcome itself is huge, and contains the most comprehensive collection of artifacts of the history of medicine—from Neolithic memorabilia to the most modern operating room of today. Although the collection is a superb one, in our opinion it is much too crowded.

Particularly in such a complex field as medicine, we found that museum displays generally do not provide sufficient information as to the original function and use of instruments and nowhere near enough information as to the state of the art or science at a particular time. For example, the Deutsches Medizinhistorisches Museum in Ingolstadt owns the original "autoclave" of Robert Koch. This noteworthy item has little meaning, though, if the museum goer has no idea of what an autoclave is, who Robert Koch was, and what the state of bacteriological knowledge was in the latter part of the nineteenth century.

We really feel that the time has come when all museums should work out a means of describing their displays in languages additional to their native ones. As a general statement, staff at museums in the Netherlands and West Germany have proven the best at providing materials in other languages and the worst are the French and English speaking countries. Unfortunately, though even those translations which are available are of relatively poor quality.

COLLECTIONS IN NORTH AMERICA

Regretably, the United States is sparsely supplied with quality medical museums, though there are several reasonably good ones in Philadelphia and Cleveland. There are some quite interesting items at Massachusetts General Hospital in Boston, but there is no museum as such. Certainly the available museums in North America are nothing to compare with the magnificent museums in London, Vienna, Leiden, Budapest, Ingolstadt, Paris, Zurich and other cities with specialized smaller collections. However, we cannot overlook the truly excellent dental museum at the National Museum of History and Technology in Washington. This museum, though, contains mainly dental and not medical artifacts.

So far as medical museums are concerned, the European collections are positive gold mines compared with what is available here. We know of no reason why this should be the case, other than a different sense of values. Two or three generations ago, Henry Ford set the pattern for this country with his famous remark "history is bunk." This is an attitude that continues to cost us dearly in a hundred different ways.

PRESCRIPTIONS FOR THE FUTURE

What would we like to see directors and curators provide for the public? The establishment of some really good medical museums certainly would help to redress this deplorable state of affairs. At the same time, the public would benefit from understanding the real nature and difficulties of medicine, its responsibilities and limitations.

At the moment the United States is one of the world leaders in medical research and expertise. Will we let these considerable accomplishments be lost to future generations simply through lack of historical perspective? We have the money and knowledge to preserve but, apparently lack the will. Hopefully this situation will not prevail. When quality medical museums are established, such aspects as the history of folk medicine, home care, frontier

medicine, native Indian medicine, the training of doctors and nurses, emergency procedures, specialized treatment, operating rooms, etc., will not have been overlooked. As every medical historian knows, there have been as many failures as successes in the history of medicine.

Early in this century the English poet Rudyard Kipling wrote the following lines:

> Wonderful little, when all is said,
> Wonderful little our fathers knew,
> Half their remedies cured your dead,
> Most of their teaching was quite untrue.

Kipling was correct in his assessments and we think it vital that museums show the failures along with the successes. In other words, it is essential that accuracy and objectivity predominate in any collection. We also feel that all displays should carefully explain the historical context along with the actual exhibits. Otherwise these displays are largely meaningless. Any competent organization which could take the responsibility for establishing good medical museums in this country would leave a priceless legacy to future generations.

BIBLIOGRAPHY TO HISTORIC SOURCES

The Medical Museum of University Hospital in London, Ontario, is offering a comprehensive bibliography for sale. Compiled by Curator J.T.H. Connor, the volume is entitled *The Artifacts and Technology of the Health Sciences: A Bibliographic Guide to Historical Sources* (91 pp.). This guide is the only major bibliography devoted to the history of medical technology and related fields. Categorized under 50 separate headings are 1200 listings of important primary and secondary sources, including: acupuncture; anaethesia; balances and weights; bloodletting; cardiography; dentistry; electrotherapy; microscopy; pharmacy; radiology; sphygmomanometry; surgery; and vision.

Also included is a brief overview of historical approaches to the study of medical technology. While of particular interest to medical museologists and collectors, this bibliography should prove beneficial to general historians in the health sciences.

The listed price of $13.95 (Canadian) per copy includes shipping and handling charges. To order this informative guide, write to J.T.H. Connor in care of the following address: Medical Museum, Room 1-AD54, University Hospital, 339 Windermere Road, P.O. Box 5339, Postal Station "A," London, Ontario, Canada, N6A5A5.

COPENHAGEN UNIVERSITY PUBLISHES DATABASE SYSTEMS HOLDINGS

Danish subscriber Anna Lis Bock has called to our attention the informative publication on database systems in use at the University of Copenhagen's Library. Compiled by Holges Friis, the late medical librarian at the university, the bulletin, which is titled "Database Information Bulletin on Nature and the Life Sciences" (ISSN 0105-2985), lists the various systems on line at the library for health systems users. As might be expected, the most prominent by far are the diverse databases originating in America. Among the most frequently used systems are:

MEDLARS/Medline from National Library of Medicine
AGRICOLA from National Agricultural Library
BIOSIS from Biosciences Information Service of Biological Abstracts
GRA from National Technical Information Service
ERIC Master Files from Educational Resources Information Center

International sources include:

PASCAL from Centre de Documentation Scientifique et Technique (CDST) due Centre National de la Recherche Scientifique (France)
FSTA from International Food Information Service (England)
MECHEN from Kung Tekniska Hogskolans Bibliotek (Scandanavia)

Persons wishing additional information on the University Library's database systems holding are advised to write to the University Medical Librarian, University of Copenhagen, Norre Allé 49, 2200 Copenhagen North (telephone: 01 39-65-23).

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